West Bay, Nova Scotia Radar and Acoustic Monitoring
Fall 2024 and Spring 2025

Tabanid Consulting Ltd.

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1 Introduction

CBCL retained Tabanid Consulting Ltd (TCL) to conduct spring and fall radar and acoustic monitoring of nocturnal migrating birds at West Bay, Nova Scotia from mid July 2024 through mid June 2025. The radar monitoring system used (program radarcam and `radR`) was initially developed through federal grant funding to P.D. Taylor at Acadia University, but has been modified and substantially improved by TCL in the past three years. TCL (or previously, P.D. Taylor at Acadia University) has used these methods to assess migratory bird movements at multiple proposed wind energy projects in the Atlantic Provinces since 2015.

Here we provide a detailed account of the specific monitoring activities at West Bay, an analysis of the observed patterns of movement of birds through the study area during that period and how they relate to weather conditions, and a summary of the key findings that are relevant to assessing the potential impact of the wind power project on migratory birds.

1.1 Project Details

Project-specific details are available from CBCL.

2 Methods

2.1 Radar Monitoring

The location for the radar was selected based on multiple criteria, including site security, clear views of the overhead sky and the ability of the radar to properly sample the avifauna moving through the site during spring and fall migration. A location central to the Project Area was chosen, close to the road but on a side trail (for additional security). It was about 5 km W of the town of Parrsboro, NS. The radar was deployed at the same location in both Fall 2024 and Spring 2025 (see Figure 1).

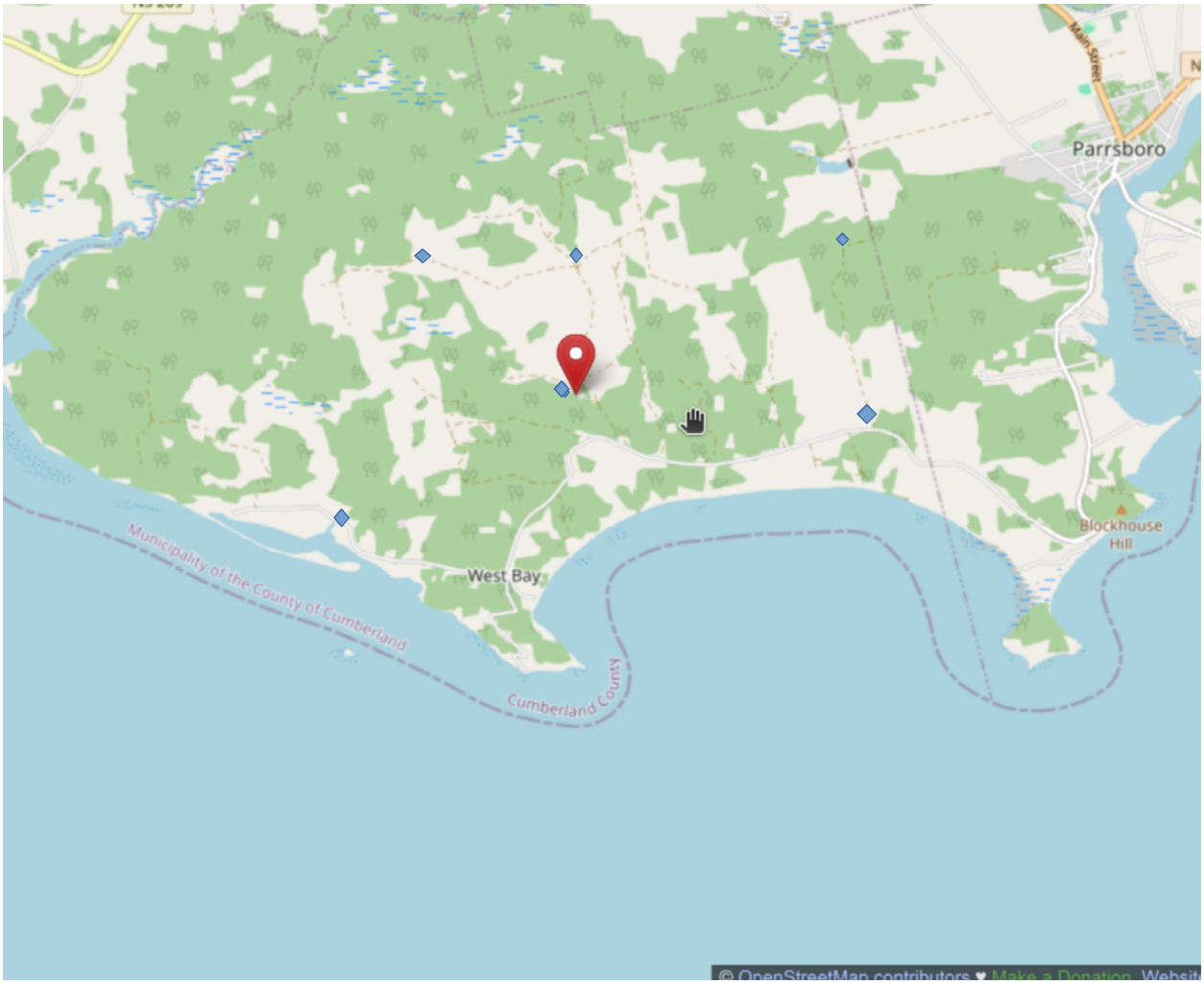


Figure 1: Project Area. Red pin is the radar location. Blue diamonds are approximate locations of the ARUs

The radar used was a a Furuno DRS25A magnetron radar (25 kW) that operated in the microwave X-band (9410 MHz) with a six foot open-array antenna (beam width of approximately 22 degrees in the horizontal plane and 1.35 degrees in the vertical plane). The radar was mounted on a custom support framework in a vertical orientation so as to obtain better information on the altitude of targets and was run in short pulse mode (2100 pulses per second) at 24 revolutions per minute (rpm).

The radar signal was digitized at 4.5 m range resolution with an azimuth resolution of 1.35 degrees using custom software developed by TCL (program `radarcam`). Raw data were saved on external hard drives in the field, and partially processed data were uploaded hourly to a remote server for safe storage. They were analyzed post-hoc using the open-source software, `radR` (Taylor et al. 2010).

The radar was operated in Fall 2024 and Spring 2025. During Fall 2024, radar data were collected from 14 July through 15 November, the dates recommended by the regulatory agency, Environment Canada. During that 124-day fall monitoring period, the radar functioned properly for 120 nights. Interruption in data collection in mid-August was a result of an under-powered solar power system (due to an unexpectedly large number of foggy days). After that failure, we added additional storage to the power system and no more outages were experienced.

During Spring 2025, radar data were collected from 15 March through to 7 June the dates recommended by the regulatory agency, Environment Canada. During this 85-day spring monitoring period, the radar

functioned properly for 76 nights (approximately 90% of the spring monitoring period). Solar inputs were below normal in early Spring, which resulted in our deliberately stopping the radar during a number of nights with little migration predicted.

2.1.1 Radar Data Processing

Targets were processed using the `radR` software (Taylor et al. 2010). Blips were extracted if their 'hot score threshold (a `radR` parameter) exceeded 2.5, across an area of 6 sample and 6 pulses. Targets were further filtered to be greater than 30 samples in size, with a minimum 'area' of 30. The minimum and maximum 'angular span' was set at 8 and 70 respectively and the radial span was set to a minimum of 6. These parameters were chosen visually by examining movies through the seasons, and adjusting most retained targets appeared to be moving things (e.g. birds, bats and insects).

These settings allowed for weak targets at long range to be identified over background noise, but also were sensitive enough to pick up insects at short range and birds at the edge of the radar beam. At West Bay the radar also picked up considerable 'clutter' (multi-path ground reflections that obscure true targets). To eliminate these areas, we created zones in program `radR` (separately for each season) that excluded these portions of the data from further analysis.

Putative bird targets were then extracted from the data by further filtering on the peak power of the radar return for each target and corrected that for range (since returned power decreases with range to the fourth power). This value of "scaled intensity" was compared across nights and in association with acoustic data to determine a threshold above which we could be confident that most targets retained were likely birds.

Rain obscures bird targets, but many birds still fly on nights with rain. Therefore, each night of radar data was then visually inspected to determine periods of rain. The start and end of each period was marked, and these periods were excluded from further analysis.

Targets were then extracted from a "column" of space starting at a distance along the ground. In Fall 2024 this was set at between 700 and 775 m from the radar and from ~75 m above ground level. In Spring 2025, there was greater clutter within the received signal, which necessitated taking data from a column of air between 300 and 500 m (up to 500 m agl) and between 750 and 900 above that. This resulted in some sampling bias, with relatively fewer targets detected above 500 m agl (because the data were captured from a greater distance).

This approach allows for sampling low altitudes horizontally from the radar, and partially excludes 'counting' targets that are detected across multiple sweeps of the beam.

2.1.2 Radar Analysis

The primary objective of the radar study was to describe the general patterns of migrating birds at the Project site through visualizations, and statistically assess how the number of targets observed below 200 m agl relate to those above 200 m agl, and how the total number of targets observed relate to particular weather variables of interest. (The 200 m threshold was selected based on the approximate height of a set of turbines in a project area).

Two response variables were derived from the radar data. The first was the number of targets detected in each hourly period across all nights. The second was the ratio of the number of targets detected below and above 200 m in altitude. That ratio is positively related to the proportion of targets flying beneath 200 m but does not represent the actual proportion, since the probability of detecting targets decreases with increasing altitude due to changes in the shape and size of the radar beam, and the size of the targets. As such, this ratio overestimates the proportion of targets observed at lower altitudes to some unknown extent. Regardless, the ratio serves as a useful indicator to determine under which conditions and times more targets are flying at relatively lower altitudes.

Weather data (wind speed and direction, pressure, temperature, and humidity) were acquired from the National Centers for Environmental Prediction (NCEP) (NOAA 2022) downloaded via the `RNCEP` package

in program `R` (R Core Team 2023) V 4.0.4). They were interpolated to an hourly value at the location using an approach identical to that employed in the function `NECP.interp`. For this report, wind data from an altitude of approximately 700-800 m were used.

The effect of weather (tailwind assistance, barometric pressure, temperature and humidity) on the log of the number of targets detected and the proportion of targets below 200 m (relative to above 200 m) was modeled using generalized linear models. Simple models were fit to show the dominant relationships between the two response variables described above and the weather variables. In addition, a 'tailwind assistance' variable was used to provide a measure of how much the wind would assist a given bird flying in a specific direction. It is known that nocturnal migrants fly with positive tailwind assistance (Peckford and Taylor 2008, Shamoun-Baranes et al. 2017)). Tailwind assistance was calculated assuming migrants are flying in a direction of 45 degrees during spring and 225 degrees in the fall. Therefore, for example in the spring, if the wind was flowing from the direction of 45 degrees, then the birds' tailwind assistance would be negative (a headwind); if the wind was flowing towards 45 degrees, the birds' tailwind assistance would be positive. The strength of the assistance is a function of both the direction of the wind, and its speed.

We also included time of night and month in the models to model temporal changes. Time of night was categorized into 'sunset', 'sunrise' and 'middle' of the night, with 'sunset' being 90 minutes after the end of evening civil twilight, 'sunrise' being 90 minutes before the beginning of morning civil twilight, and 'middle' representing the remainder of the night. Civil twilight was calculated using the `suncalc` package in `R` (v.0.5.1; (Thieurmel and Elmarchraoui 2022)). This variable help assess how total numbers differed at migratory initiation (sunset), cessation (sunrise) and during the night.

The `R` package `tidyverse` (Wickham et al. 2019) was used for data manipulation and visualization and the function 'glmer' in package `lme4` (Bates et al. 2015) was used for statistical modelling. In all cases, mixed effects models were fit using the variables described above, but also including the day of the year as a random effect. Treating day as a random effect allows the model to account for additional variation in counts that is not fully captured by the weather or timing variables. Models of the total counts were fitted with a 'poisson' family (i.e., the relationship between the response and the predictor variables was on a log scale) and measure of the proportions were filled using a 'binomial' family, which transforms the response using a log-odds ratio. Model fits were assessed by examining residual plots.

Rather than present tables of tests of significance, we generally describe the best fit models (chosen using AIC) and present figures that show the relationships between the response and predictor variables. These figures provide the reader with an easier way to visualize how wind and weather influence the patterns of movements of birds at the site.

2.2 Acoustic Monitoring

A network of six automated recording units (ARUs) were placed throughout the Project Area (see Figure 1). We used Audiomoths (from Open Acoustic Devices) with firmware version 1.10.1 (Fall 2024) or 1.11.1 (Spring 2025). Sensors were placed in open areas, microphones facing upwards with a clear view of the sky. Units were placed in plastic ziploc bags to reduce the unwanted ingress of water. The plastic bag has a minimal effect on the detection ability of the units (Kitzes lab). The detection range of each recording unit is estimated to be up to approximately 100 m for NFCs of migratory birds. Some units failed prematurely (due to water issues, animal disturbance and power failures) but we obtained data for all nights, but on 92% of nights at least 4 units recorded properly.

The sensors were programmed to begin recording approximately one hour before the end of evening civil twilight and finish recording one hour after the beginning of morning civil twilight. It is during this period that birds make nocturnal flight calls (NFCs) while actively migrating (Evans 2005). Sensors were on a 10 min on/off duty cycle, and so captured data from approximately half of the night (which is sufficient to characterize migratory behaviour at a site). Units were checked periodically (approximately every 30-45 days) to replace batteries and download data.

2.2.1 Acoustic Data Processing

Acoustic data were sampled 32 kHz which encompasses the frequency range where NFCs occur. All files were subset to encompass only the period of time between the end of evening civil twilight and the beginning of morning civil twilight. Civil twilight was calculated using the `suncalc` package in `R` (v 0.5.1; Thieurmel and Elmarchraoui 2022).

Acoustic data were then processed using a custom-built artificial intelligence (AI) NFC detection model developed by TCL using the `opensoundscape` python package (Lapp et al. 2023; opensoundscape.org). The AI model was trained on a set of validated calls from comparable ARUs that have been deployed in the Maritime provinces since 2019. The NFC model assigns a 'score' to each species or species group. That probability is related to the probability that a specific acoustic detection actually is that species. In addition, all files were processed using the `HawkEars` model (Huus et al. 2025) which was used to detect and classsify shorebird, thrush and heron flight calls. It similarly provides a 'confidence' for each detection, that can be used to initially filter detections for further validation.

Species (or groups) detected by each model are presented in Table 1. Hereafter, when we refer to 'species' we are referring to either the species, or the higher level group (species group).

Table 1: Table 1. List of Species Codes and Names

Group	Code	Common Name or Group	Latin Name
Herons	ambi	American Bittern	*Botaurus lentiginosus*
	bcnh	Black-crowned Night-Heron	*Nycticorax nycticorax*
	gbhe	Great Blue Heron	*Ardea herodias*
Nightjars	coni	Common Nighthawk	*Chordeiles minor*
Shorebirds	amgp	American Golden-Plover	*Pluvialis dominica*
	bbpl	Black-bellied Plover	*Pluvialis squatarola*
	dunl	Dunlin	*Calidris alpina*
	grye	Greater Yellowlegs	*Tringa melanoleuca*
	lesa	Least Sandpiper	*Calidris minutilla*
	sepl	Semipalmated Plover	*Charadrius semipalmatus*
	sssa	Solitary/Spotted Sandpiper	*NA*
	whim	Whimbrel	*Numenius phaeopus*
Sparrows	cups	Cup Sparrow	*NA*
	savs	Savannah Sparrow	*Passerculus sandwichensis*
	sfhs	Song/Fox Sparrow	*NA*
	wtsp	White-throated Sparrow	*Zonotrichia albicollis*
Thrushes	heth	Hermit Thrush	*Catharus guttatus*
	swth	Swainson's Thrush	*Catharus ustulatus*
	veer	Veery	*Catharus fuscescens*
	amre	American Redstart	*Setophaga ruticilla*
	baww	Black-and-white Warbler	*Mniotilta varia*
	btbw	Black-throated Blue Warbler	*Setophaga caerulescens*
	cawa	Canada Warbler	*Cardellina canadensis*

Warblers			
	coye	Common Yellowthroat	*Geothlypis trichas*
	cswa	Chestnut-sided Warbler	*Setophaga pensylvanica*
	dbup	Black-throated Green/Tennessee	*NA*
	mowa	Mourning Warbler	*Geothlypis philadelphia*
	oven	Ovenbird	*Seiurus aurocapilla*
	sbds	Parula/Palm Warbler	*NA*
	zeep	Zeep Warblers	*NA*
Woodcock	amwo	American Woodcock	*Scolopax minor*

Samples of NFCs detected by the either model were validated (examined by an expert to determine that they were in fact the species assigned by the model) and used to develop an index of the within season pattern of occurrence and detection frequency for each species. Detection frequency is related to multiple factors, including the average height that a species flies, the intensity of its call, and the ability of the AI model to detect and classify it. Thus, they can be roughly considered as some index of 'abundance' but should not be treated directly as such, without more knowledge of the biases above.

For validation, we extracted the top scoring calls for each species in each hour, for each day, and for each microphone that was operational that day for each of the the two models. (For thrushes, we only sampled as such from the months of Sept through November, since almost all thrush calls outside of that period are resident species, calling from the ground). These calls were then ordered from top scoring down, and were classified as being either correctly identified, or as unidentified by visualizing an enhanced spectrogram of the call (for most species), and/or by listening (shorebirds and thrushes). We used the TCL model for all Warblers and Sparrows, and the `HawkEars` model for Thrushes, Shorebirds and Herons.

The final set of calls used for visualization and analysis is therefore a minimal estimate of the number of calls detected on any given night of migration, but should be related positively to the density of individuals of that species (or group) flying over the site on a given night. The sampling scheme ensures that data from all microphones and all nights are sampled, which provides robust coverage of the study area.

2.3 Data Analysis

Data analysis was conducted in `Rstudio` (V. 2025.05.01) running program `R` (R Core Team 2023) V 4.0.4) and `python` V.3.10.

3 Results

The results of radar and acoustic monitoring are presented below for data collected during the Spring and Fall migration seasons.

3.1 Spring Migration

Radar and acoustic data were collected between 15 March 2025 and 7 June 2025.

3.1.1 Nocturnal Migration Patterns

A plot showing the pattern of migratory activity across all nights for the spring season can be found in the Appendix A. About 50% of the total migration activity was observed across on 8 nights, in three groups (30 April and 1 May, 11, 12, 13 May, 26, 27 and 28 May; nights are defined by the date on which sunset occurs).

On all but one of those nights (11 May) there was greater activity above 200 m compared to below, with the odds of being above (the ratio of targets above to below the beam) ranging from 1.76 to 14.6. The odds of being below the 200 m level was higher in April and June compared to May.

The altitudinal, seasonal, and within night distribution of radar targets for these top nights in the spring is shown in Figure 2 below. The nights are selected to show a range of patterns, primarily of the high-volume nights. Each plot is a separate night, with the beginning and end of civil twilight indicated by the vertical green and yellow lines, respectively. Date and time are on the x-axis and altitude is on the y-axis. Hexagonal points are radar detections divided into time and altitude bins and are scaled from light grey (few detections) through dark purple, blue, green to yellow (many detections). Wind direction and strength aloft (~700 m) for each hour are displayed at the top of each plot via a red arrow. Red lines represent the approximate altitudinal range of the rotor swept zone. It should also be noted that calling frequency is known to not be constant and some species migrate without calling (e.g., vireos and flycatchers; (Smith et al. 2014)).

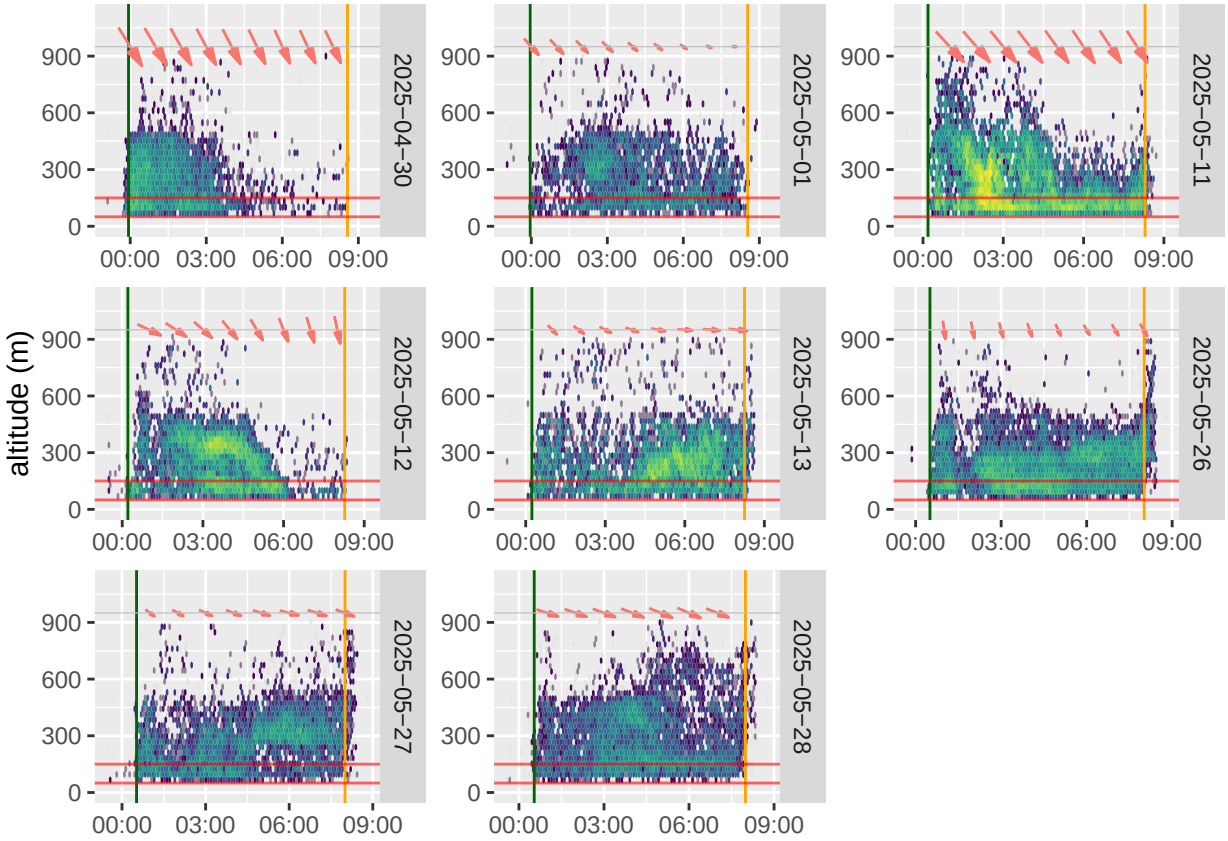


Figure 2: Major nights of migration in Spring 2025

3.1.2 Numbers of targets in relationship to weather variables

Statistical models supported the hypothesis that the total number of birds aloft was related to tailwind assistance, the time of night (sunset, sunrise, and middle of the night) and weather (temperature, surface pressure and relative humidity).

The most important differences can be attributed to different behaviours through the night. Typically, numerous targets appear immediately after the initiation of migration (take-off after sunset) and during the middle of the night (continued migration), whereas fewer are detected in the morning. That the period

immediately before dawn sees many fewer targets may reflect that birds are either not landing within the Project Area following migration or they are consistently ending their migration flights earlier in the night.

We present two figures as examples of how the number of targets aloft are related to wind (tailwind assistance) and weather (relative humidity) and how those relationships vary with time of year and time of night. In each plot, a point represents the number of targets in hourly bins, classified by time periods (panels) and month (colours). The number of targets is shown on a log axis, to improve visualization.

Figure 3 shows how total numbers relate to tailwind assistance. Winds aloft are represented on the x-axis (km per hour) with negative values representing a headwind and positive values representing a tailwind. The lines are regressions for each group. The figure shows that in the middle of the night (with the bulk of migration) there are few targets with strong headwinds, the most targets with moderate tailwinds, and fewer targets again with strong tailwinds. At other times of the night, the relationship varies. For example, in the middle of the night in May (the time when most targets are detected) there is a curved relationship; there are more likely to be targets as the tailwind assistance goes from negative to positive, but with strong tailwinds, the number of targets declines. This follows a general pattern that birds prefer to migrate with tailwinds or very light headwinds (Peckford 2006).

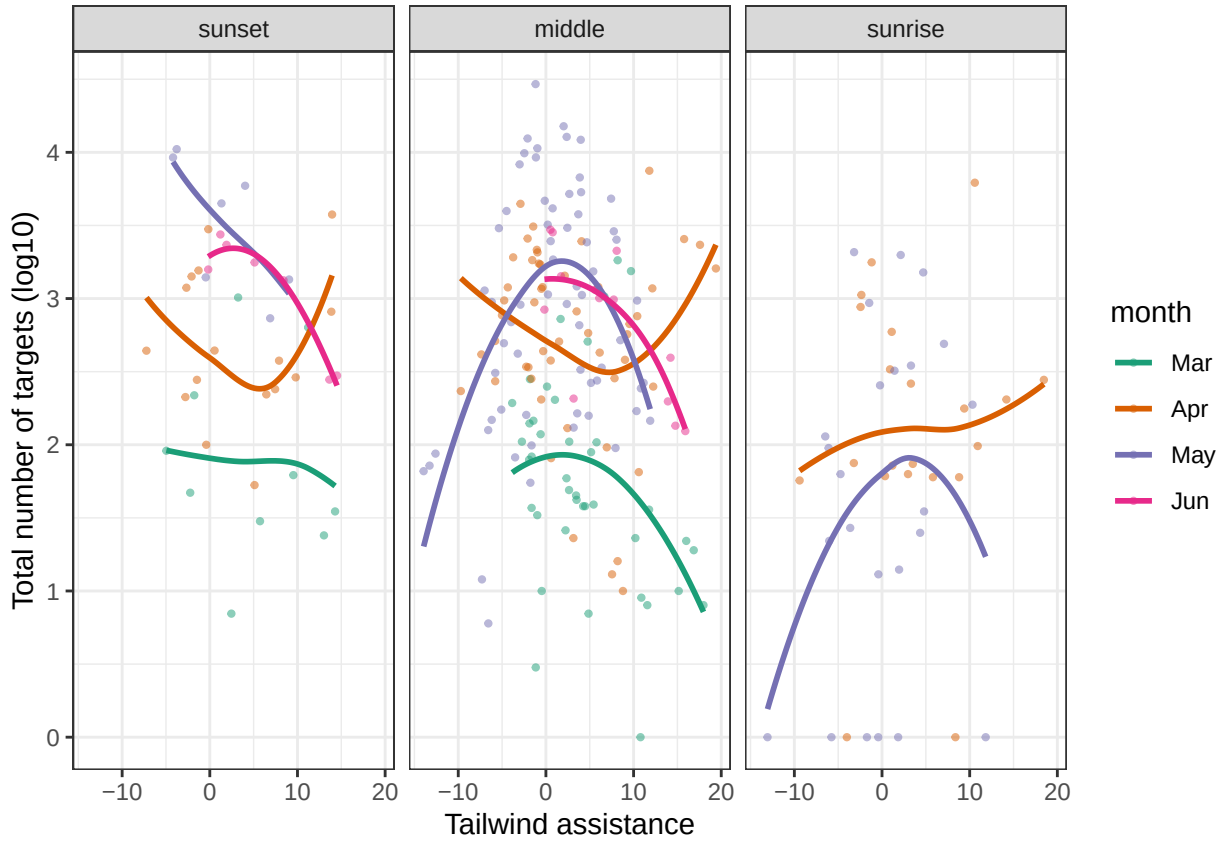


Figure 3: Relationship between Tailwind Assistance on Total Number of Targets across Time of Night and Month during Spring 2025.

Figure 4 shows the relationship between the number of targets detected (as described above) and relative humidity. Generally, throughout the season, the number of targets detected decreased as relative humidity increased. This relationship was strongest in May when more targets were detected but was weaker during the sunrise period when fewer birds were detected overall.

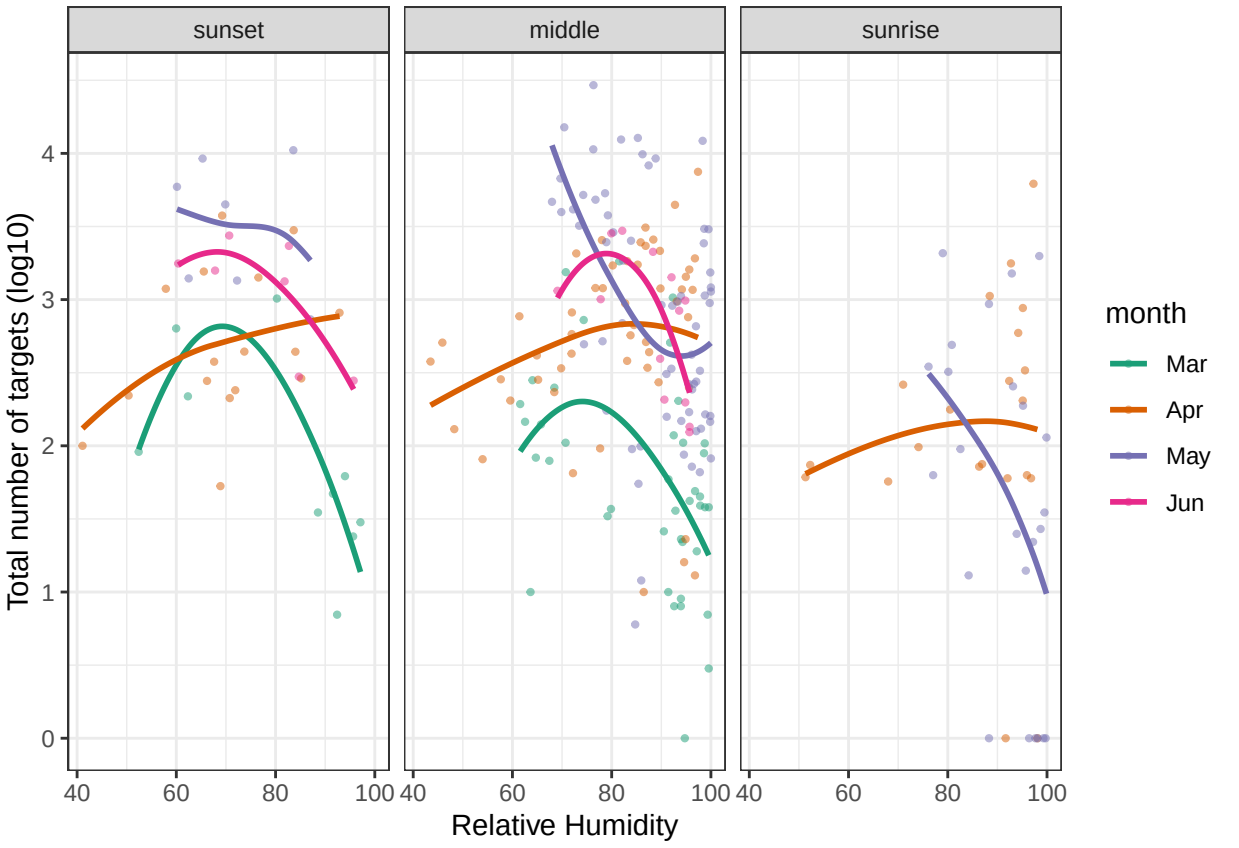


Figure 4: Relationship between Relative Humidity on Total Number of Targets across Time of Night and Months during Spring 2025.

3.1.3 Altitudinal Distribution of Radar Targets

Across all nights, most targets observed were at lower altitudes with the number of targets generally decreasing with increasing altitude. This decline is partly due to an actual decrease in the number of birds, but also reflects the declining probability of detecting birds at more distant ranges. For the Spring 2025 data, the reduced numbers of targets above 500 m is also partly a function of the fact that we used data collected further from the radar for those altitudes, so the probability of target detection is lower.

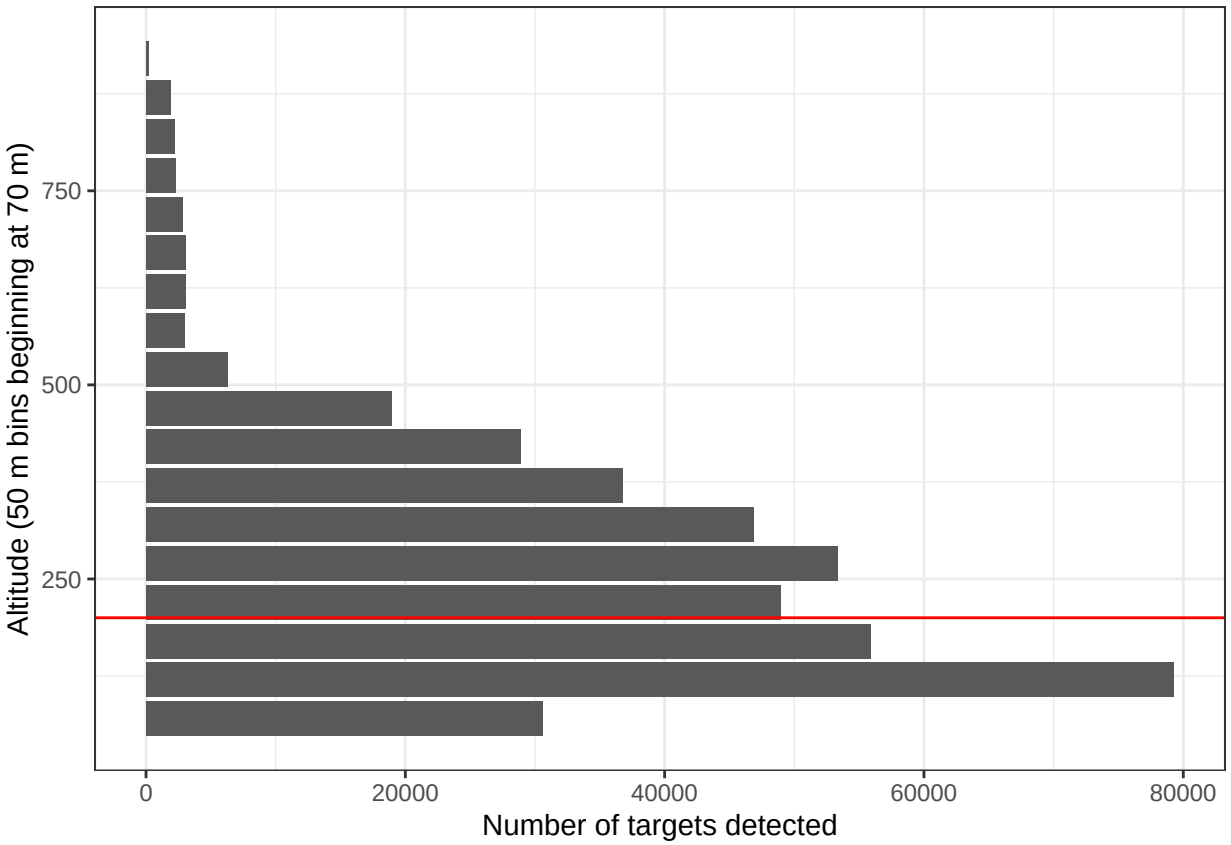


Figure 5: Radar Targets by Altitude during Spring 2025

Figure 6 shows the density of radar detections by altitude for the 9 major nights in the spring. The red line is at 200 m. The pattern of radar targets by altitude varied across nights. On one of the early nights (26 April) large numbers of targets are moving quite high. It is likely these are migrating Scoters which peak through the area around that time (e.g. see ebird checklist: https://ebird.org/checklist/S230034268). On other peak migration nights, the majority of targets were observed above the RSA, but more were closer to 200 m in elevation.

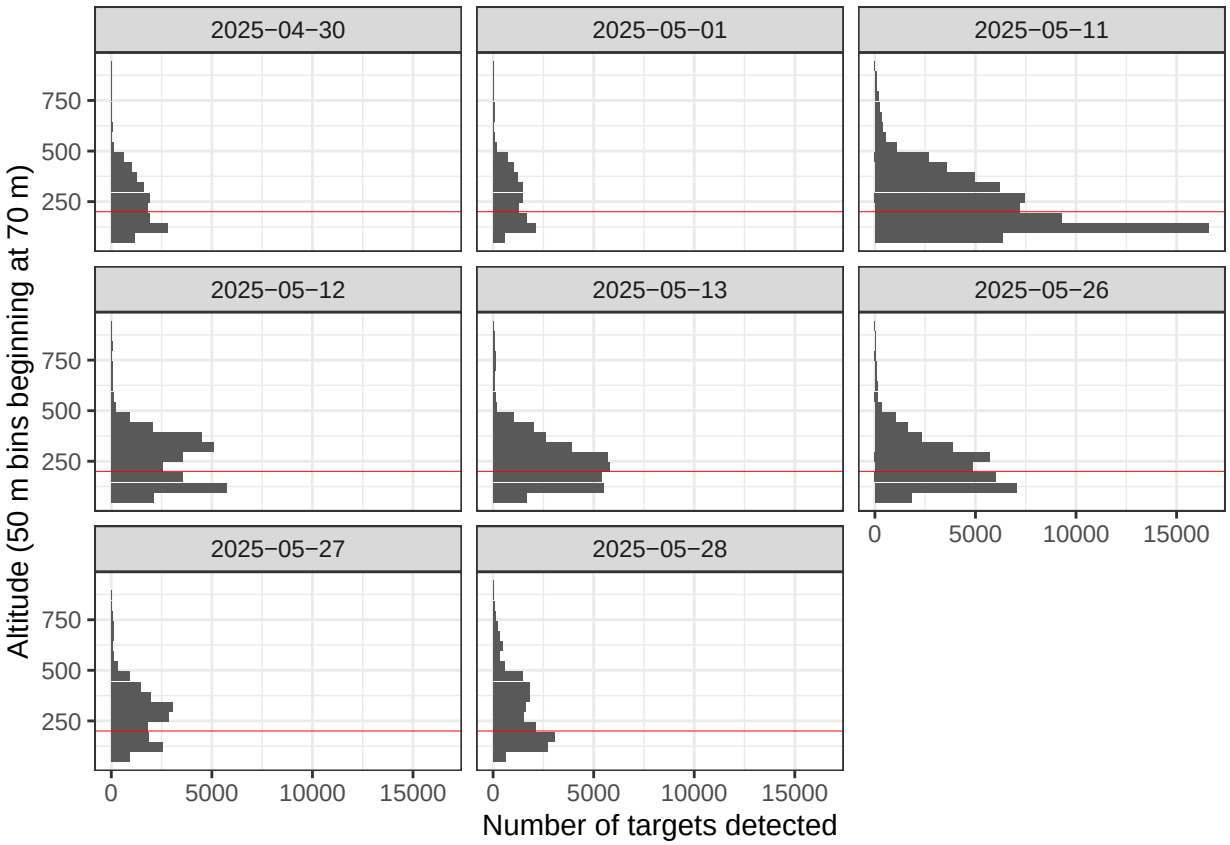


Figure 6: Radar Targets by Altitude for Select Nights during Spring 2025.

3.1.4 Analysis of the relative Number of Birds at Lower Altitudes

The number of targets at lower altitudes is related to weather and season. We analysed this relationship by modelling how the proportion of targets flying at low altitudes (below 200 m) related to the total number of targets aloft, tailwind assistance (as described above), time of night (sunset, sunrise, and middle of the night) and weather (temperature, surface pressure and relative humidity). We found support for the relationship between the relative number flying at lower altitudes and all of the explanatory variables except surface pressure.

We present two figures as examples of how the relative number of targets below vs. above 200 m is related to the total number of targets aloft, to wind (tailwind assistance) and to weather (relative humidity) and how those relationships vary with time of year and time of night. Here, each a point represents the proportion of targets at low altitude in each hourly bin, classified by time periods (panels). The total number of targets (x axis) is shown on a log10 scale, to improve visualization.

Figure 7 shows that there is a general decrease in the proportion of targets below 200 m with increasing numbers of targets, but only at sunset and in the middle of the night.

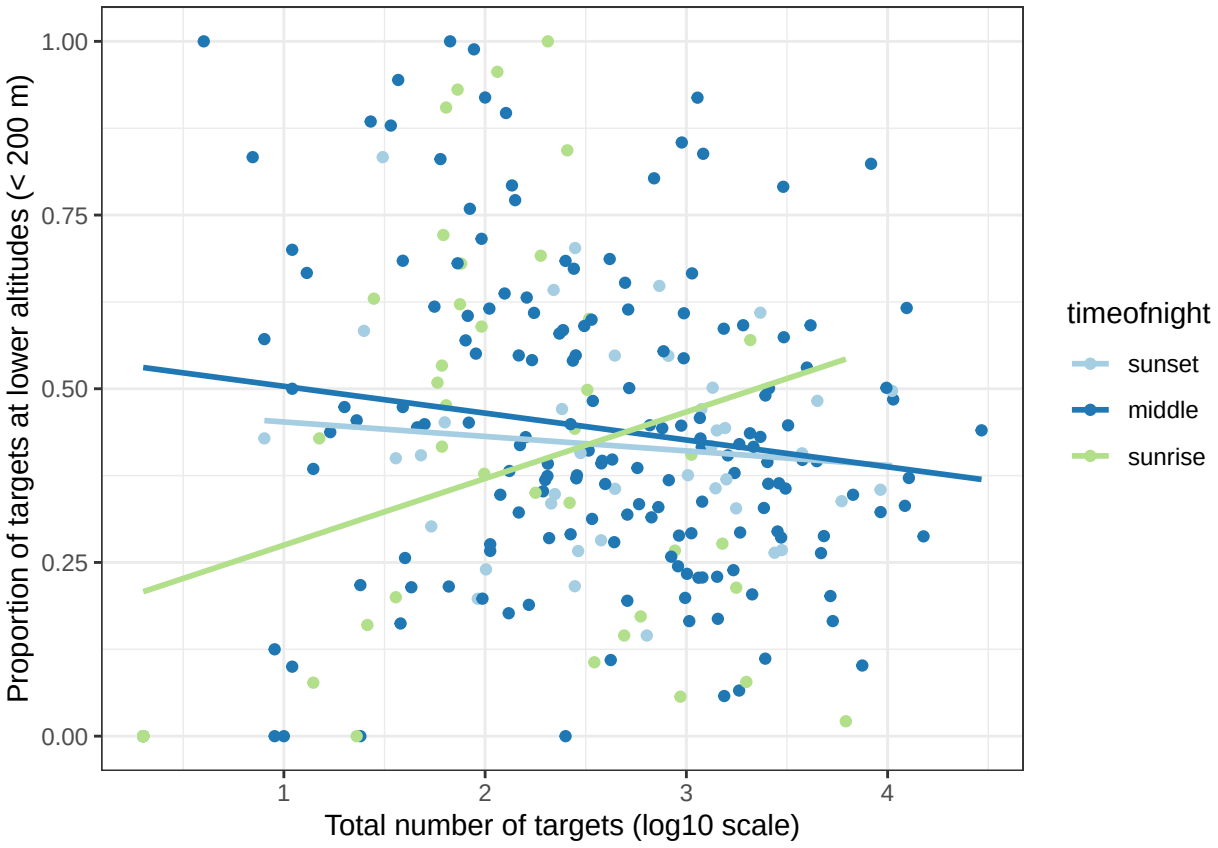


Figure 7: Proportion of Targets at Low Altitude in Comparison to Total Number of Targets across Time of Night during Spring 2025.

Figure 8 are a set of boxplots that show how the distribution of proportions (the number of birds detected below 200 m divided by the total number of birds observed in each hourly bin) changes with time of night and tailwinds. The width of each boxplot is proportional to the total number of targets in that category. As tailwind assistance increases, the number of targets increases, but the the proportion of targets below 200 m decreases. This is especially true in the middle of the night, where the bulk of migration occurs.

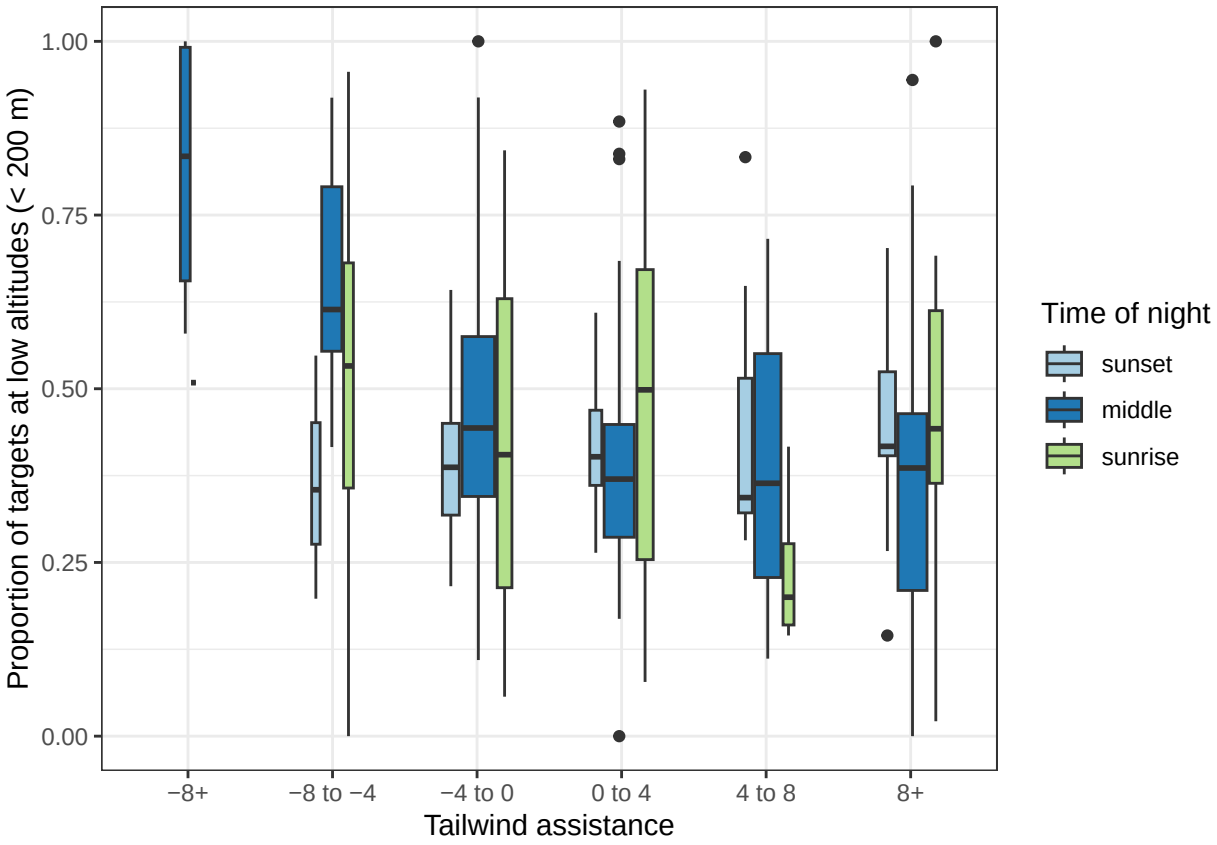


Figure 8: Proportion of Targets at Low Altitude in Comparison to the degree of tailwind assistance during Spring 2025.

3.1.5 Nocturnal Flight Call Detections

Figure 9 shows the distribution of all detections by night through the spring, accumulated into broad species groups. (Note that the y axis is scaled differently for each species group). We detected only Sparrows and Warblers in the spring (we did not attempt to detect thrushes, since most are detections from arriving birds on the ground). The general pattern is as expected in the region, with Sparrows arriving early in the period, and Warblers later. The two major movements of birds in early and late May observed in the radar data, can be seen in the plot of acoustic data.

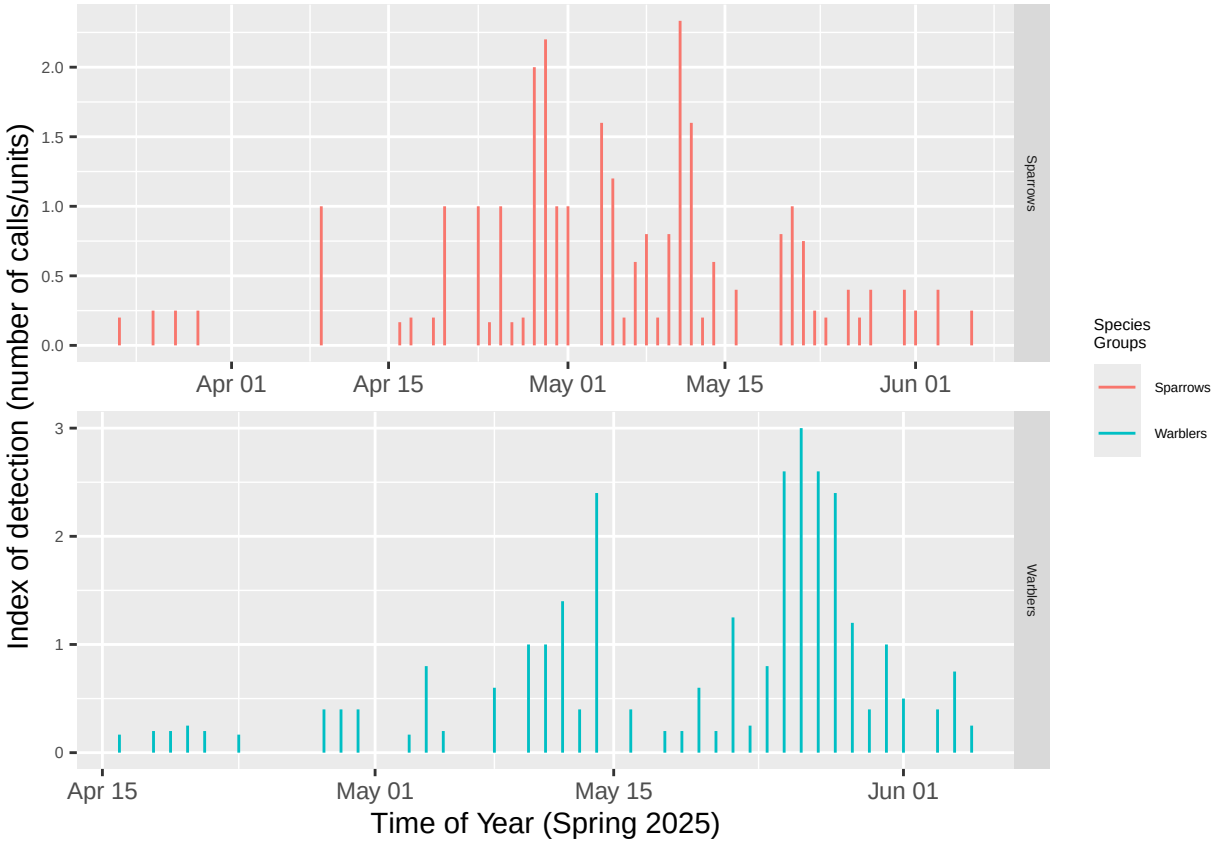


Figure 9: Nocturnal Flight Call Detections by Species Group and Time of Year during Spring 2025

Figure 10 shows the distribution of acoustic detections by species across the Spring. Each dot represents one validated detection for one species. They are plotted on a separate panel for each species, with the time of the detection (relative to sunrise) on the y axis, and the time of year on the x axis.

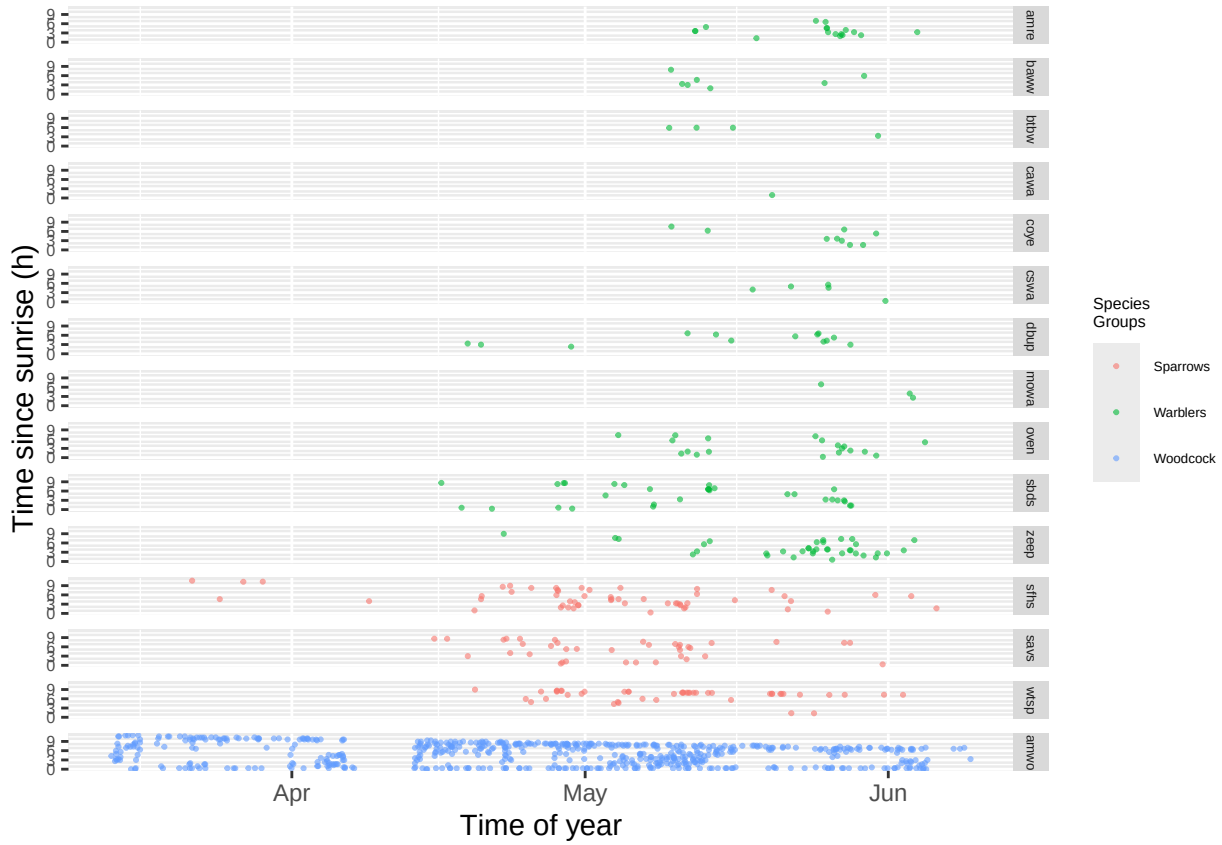


Figure 10: Nocturnal Flight Call Detections by Species Group and Time of Year during Spring 2025.

The timing of detections reflect the pattern of species movement in the region. Large numbers of American Woodcock represent the constant presence of breeding birds that are vocal at night in the Spring.

Very few NFCs were detected during April. The majority of the sparrows were detected prior to May 15 with a peak on May 15. Most warbler NFCs were concentrated in late May. There were no detections of Common Nighthawk.

3.2 Fall Migration

Radar and acoustic data were collected between 14 July 2024 and 15 November 2024.

3.2.1 Nocturnal Migration Patterns

A plot showing the pattern of migratory activity across all nights for the fall season can be found in the Appendix B. 60% of the total migration activity was observed across on 9 nights, in three groups (22 August 13, 14, 19 and 20 September, 5, 16, 17 and 18 October). On all but three of those nights (22 August, 14 September, 16 October) there was greater activity above 200 m compared to below, with the odds of being above (the ratio of targets above to below the beam) ranging from 1.43 to 5.4). The odds of being below the 200 m level varied with time of year.

The altitudinal, seasonal, and within night distribution of radar targets for these top nights in the fall is shown in Figure 11. Each plot is a separate night, with the beginning and end of civil twilight indicated by the vertical green and yellow lines, respectively. Date and time are on the x-axis and altitude is on the y-axis.

Hexagonal points are radar detections divided into time and altitude bins and are scaled from light grey (few detections) through dark purple, blue, green to yellow (many detections). Wind direction and strength aloft (~700 m) for each hour are displayed at the top of each plot via a red arrow. Red lines represent the approximate altitudinal range of the rotor swept zone.

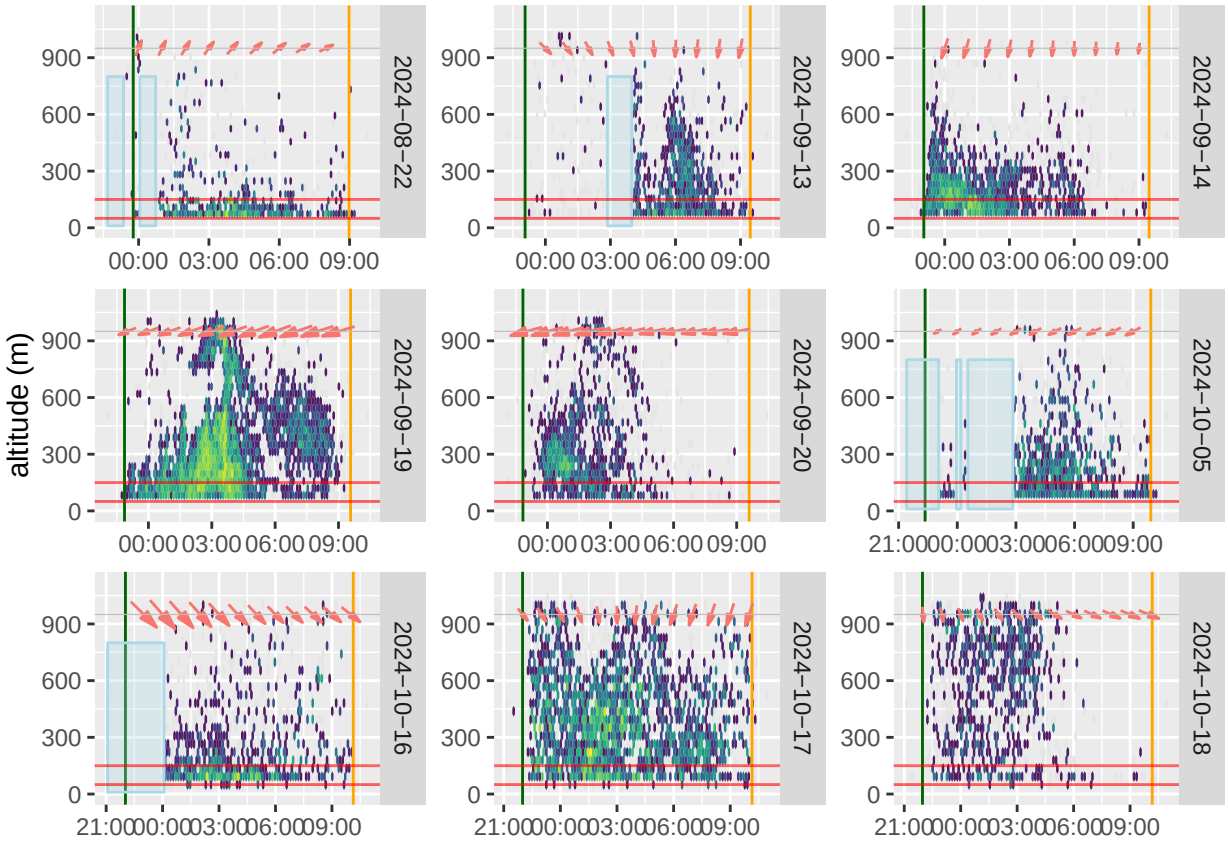


Figure 11: Major nights of migration in Fall 2024

3.2.2 Numbers of targets in relationship to weather variables

As in the Spring, statistical models supported the hypothesis that the total number of birds aloft was related to tailwind assistance, the time of night (sunset, sunrise, and middle of the night) and weather (temperature, surface pressure and relative humidity).

We present two figures as examples of how the number of targets aloft are related to wind (tailwind assistance) and weather (relative humidity) and how those relationships vary with time of year and time of night. In each plot, a point represents the number of targets in hourly bins, classified by time periods (panels) and month (colours). The number of targets is shown on a log axis, to improve visualization.

Figure 12 shows how total numbers relate to tailwind assistance. Winds aloft are represented on the x-axis (km per hour) with negative values representing a headwind and positive values representing a tailwind. The lines are linear regressions for each group. The figure shows that there is a consistent positive relationship between the two variables (birds are more likely to fly with as the strength of the tailwinds increase) but that relationship varies somewhat with the time of night and the month. For example, in November (the time when the fewest targets are detected) the relationship does not hold in the middle of the night or at sunrise.

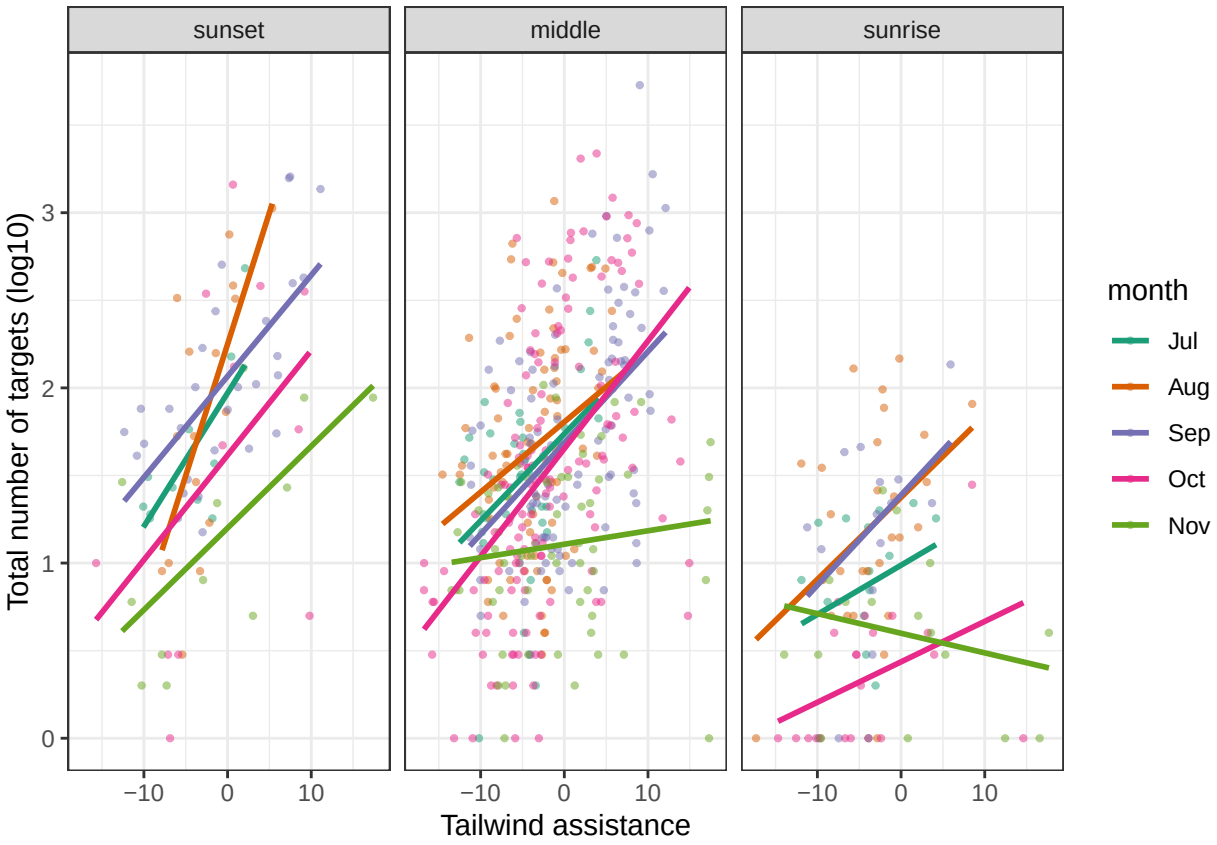


Figure 12: Relationship between Tailwind Assistance on Total Number of Targets across Time of Night and Month during Fall 2024.

Figure 13 shows the relationship between the number of targets detected (as described above) and relative humidity. The plot shows that this relationship varies considerably across months and time of night, but generally, there are fewer targets with higher humidity.

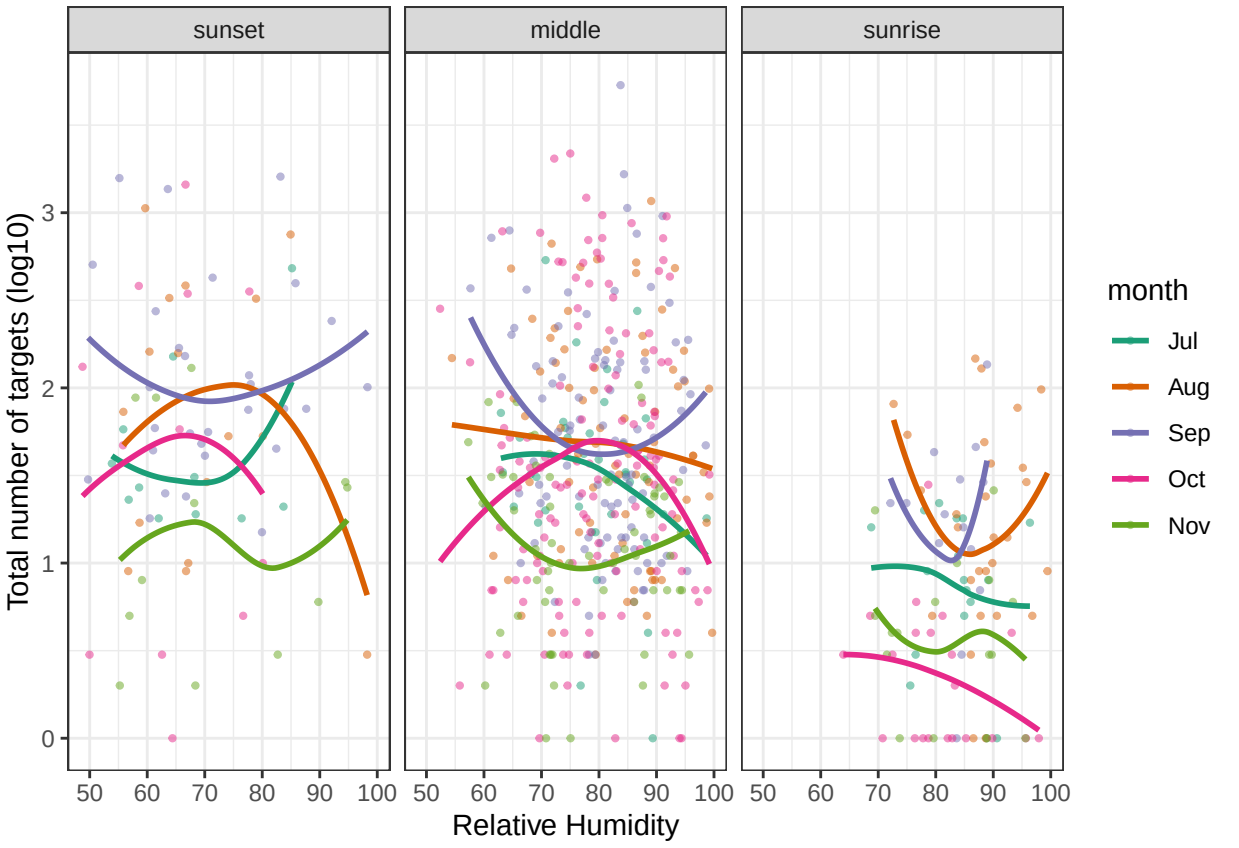


Figure 13: Relationship between Relative Humidity on Total Number of Targets across Time of Night and Months during Fall 2024.

3.2.3 Altitudinal Distribution of Radar Targets

Across all nights, most targets observed were at lower altitudes with the number of targets generally decreasing with increasing altitude. This decline is partly due to an actual decrease in the number of birds, but also reflects the declining probability of detecting birds at more distant ranges. It is difficult to separate the effects of these two variables. The red line shown in Figure 14 below is at 200 m.

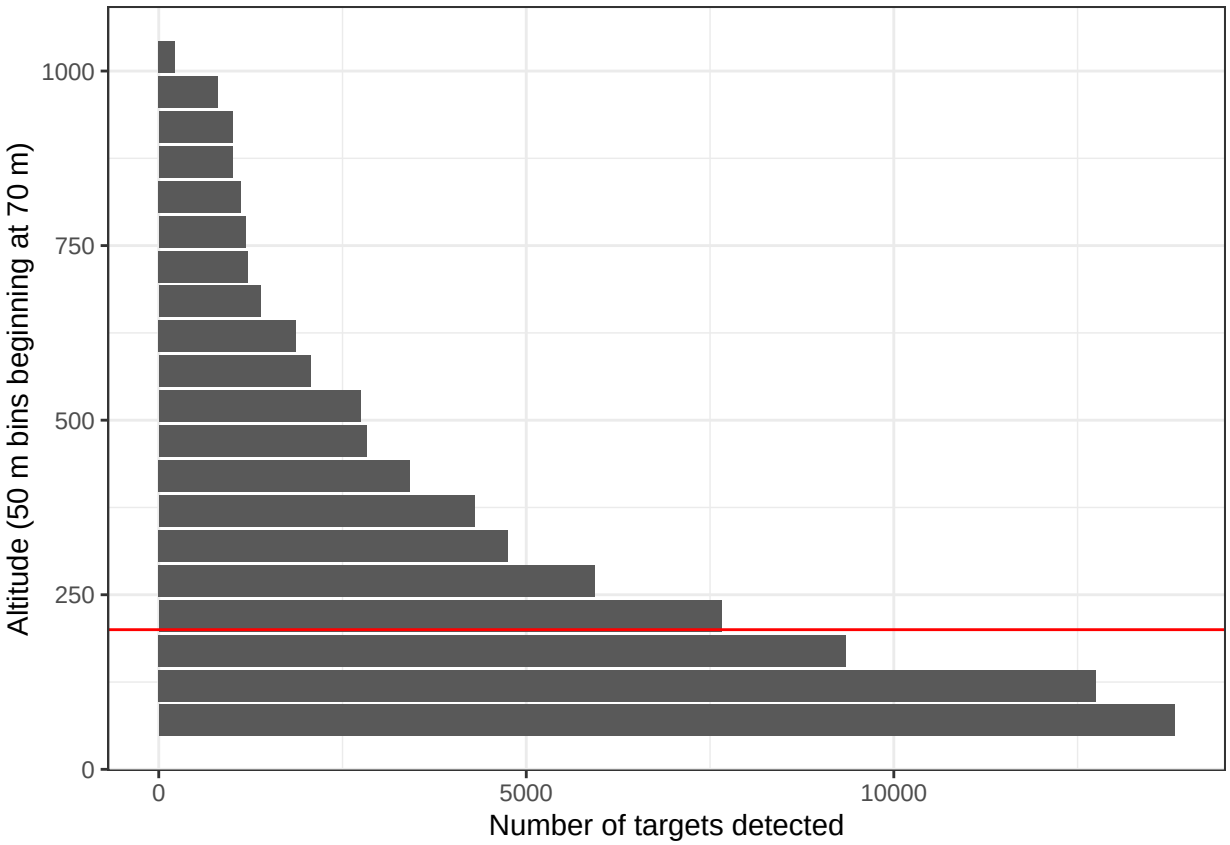


Figure 14: Radar Targets by Altitude during Fall 2024.

Figure 15 shows the density of radar detections by altitude for the 9 major nights. The red line is at 200 m. The pattern of radar targets by altitude varied across nights. On 15 August and 15 September larger numbers of targets were moving lower but on other peak migration nights (22 August, 18 October), the majority of targets were observed above 200 m.

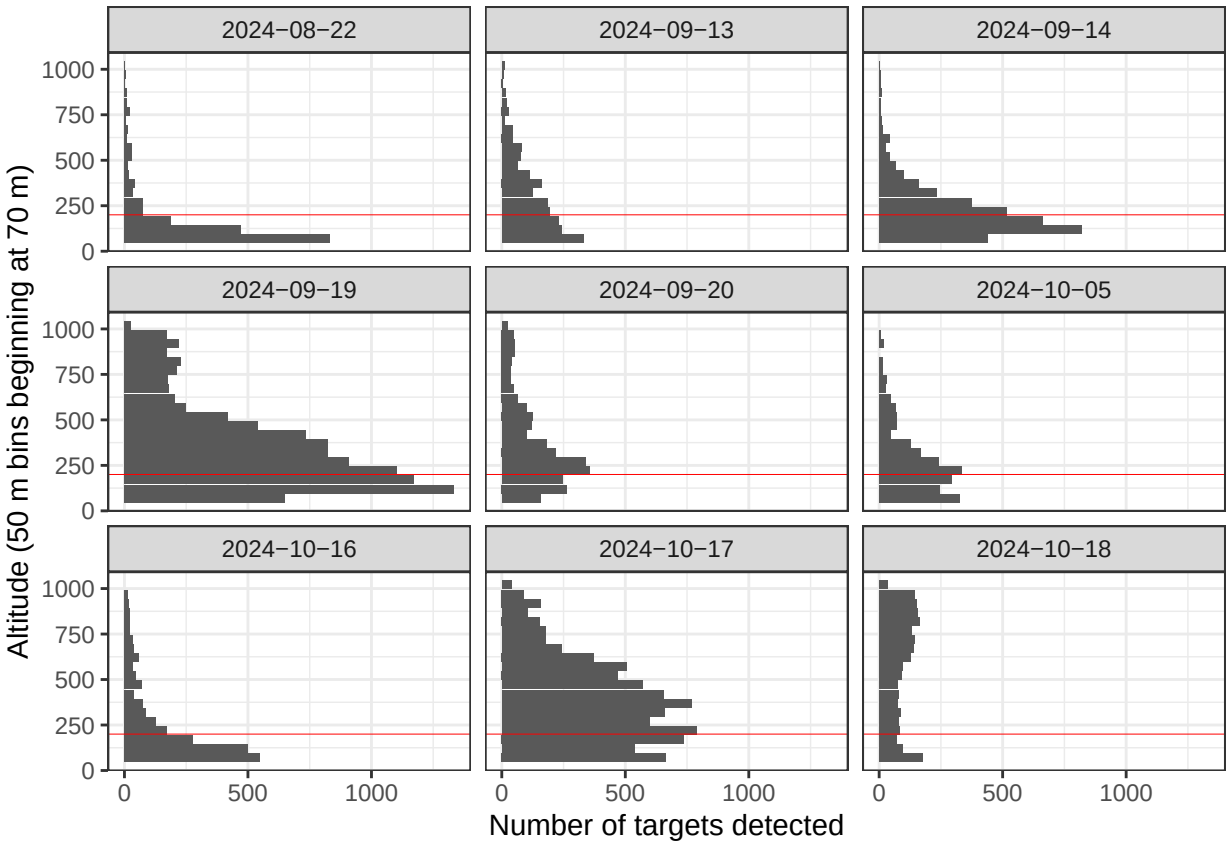


Figure 15: Radar Targets by Altitude for Select Nights during Fall 2024.

3.2.4 Analysis of the relative Number of Birds at Lower Altitudes

The number of targets at lower altitudes is related to weather and season. As in the spring, we analysed this relationship by modelling how the proportion of targets flying at low altitudes (below 200 m) related to the total number of targets aloft, tailwind assistance (as described above), time of night (sunset, sunrise, and middle of the night) and weather (temperature, surface pressure and relative humidity). We found strong support for the relationship between the relative number flying at lower altitudes and all of the explanatory variables except surface pressure.

Again, we present two figures as examples of how the relative number of targets below vs. above 200 m is related to the total number of targets aloft, to wind (tailwind assistance) and to weather (relative humidity) and how those relationships vary with time of night. Here, each a point represents the proportion of targets at low altitude in each hourly bin, classified by time periods (panels). The total number of targets (x axis) is shown on a log10 scale, to improve visualization.

Figure 16 shows again that the proportion of targets at lower altitudes (below 200 m) decreases as the number of targets increases.

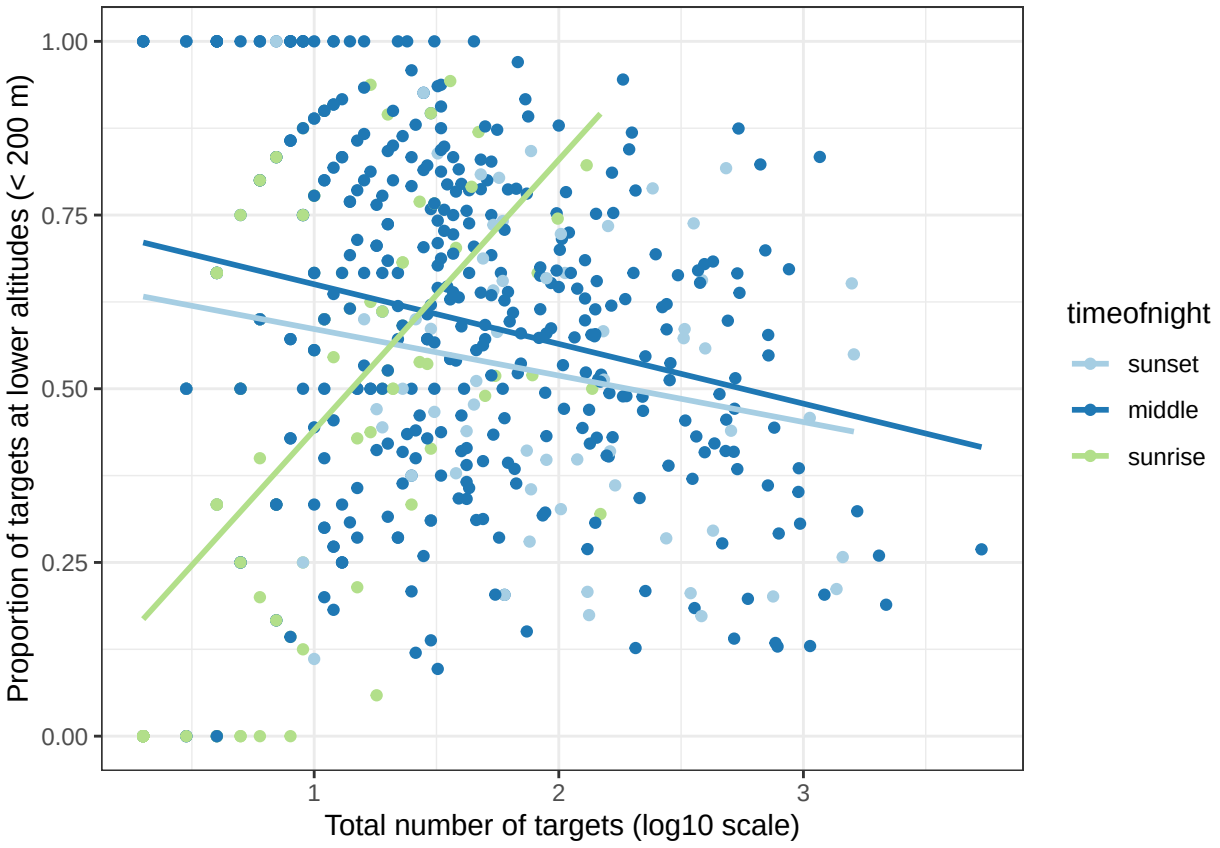


Figure 16: Proportion of Targets at Low Altitude in Comparison to Total Number of Targets across Time of Night during Fall 2024.

Figure 17 are a set of boxplots that show how the distribution of proportions (the number of birds detected below 200 m divided by the total number of birds observed in each hourly bin) changes with time of night and tailwinds. The width of each boxplot is proportional to the total number of targets in that category. As tailwind assistance increases, the number of targets increases, but the the proportion of targets below 200 m decreases (then increases again with stronger tailwinds). This is especially true in the middle of the night, where the bulk of migration occurs. The proportion of targets below 200 m in fall was generally higher than in spring. It is possible that this is due to increased insect 'contamination' of the radar data in the fall, but may also suggest that birds are generally flying lower then compared to the spring.

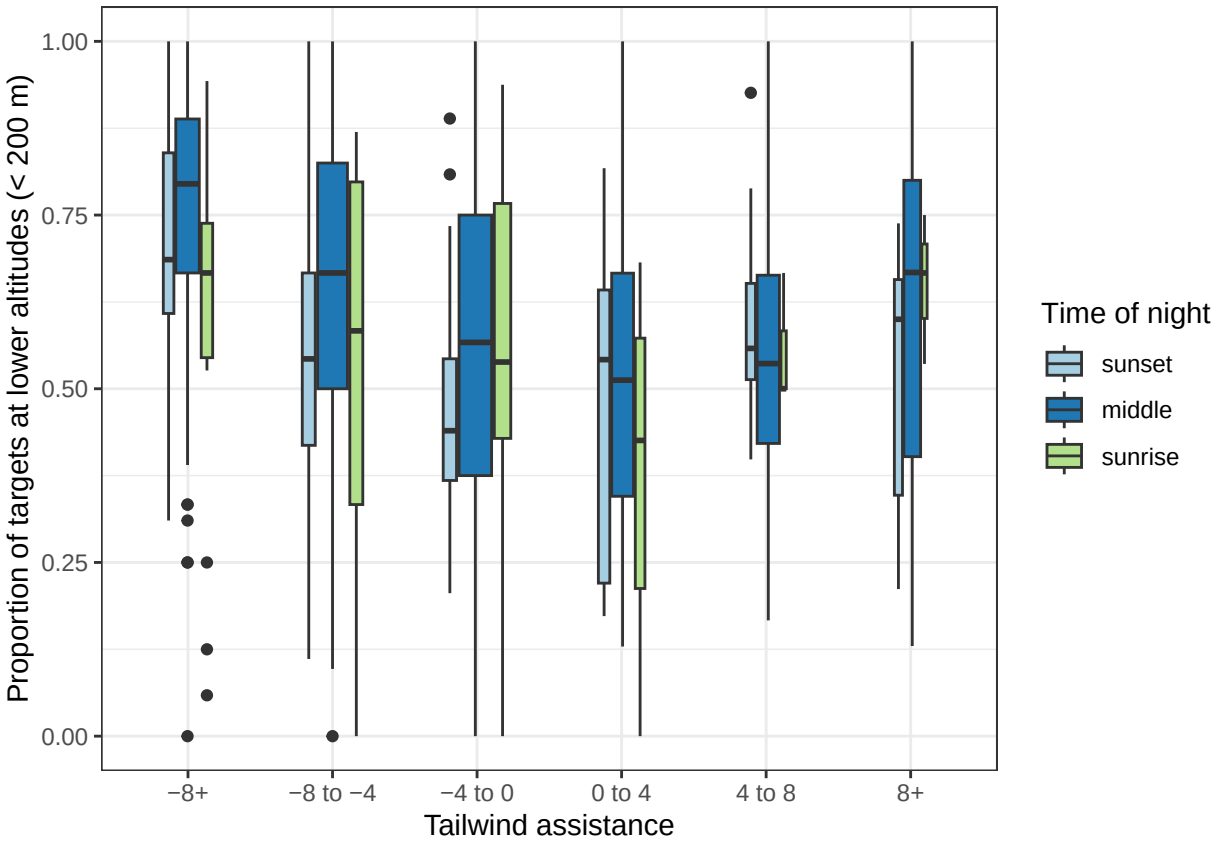


Figure 17: Proportion of Targets at Low Altitude in Comparison to the degree of tailwind assistance during Fall 2024.

3.2.5 Nocturnal Flight Call Detections

Figure 18 shows the distribution of all NFC detections by night through the fall, accumulated into broad species groups. Note that the y axis is scaled differently for each species group. The general pattern is as expected in the region, with Warblers arriving early in the period, and Sparrows later. Shorebirds were detected at low numbers throughout the period and Thrushes were detected consistently through September and early October.

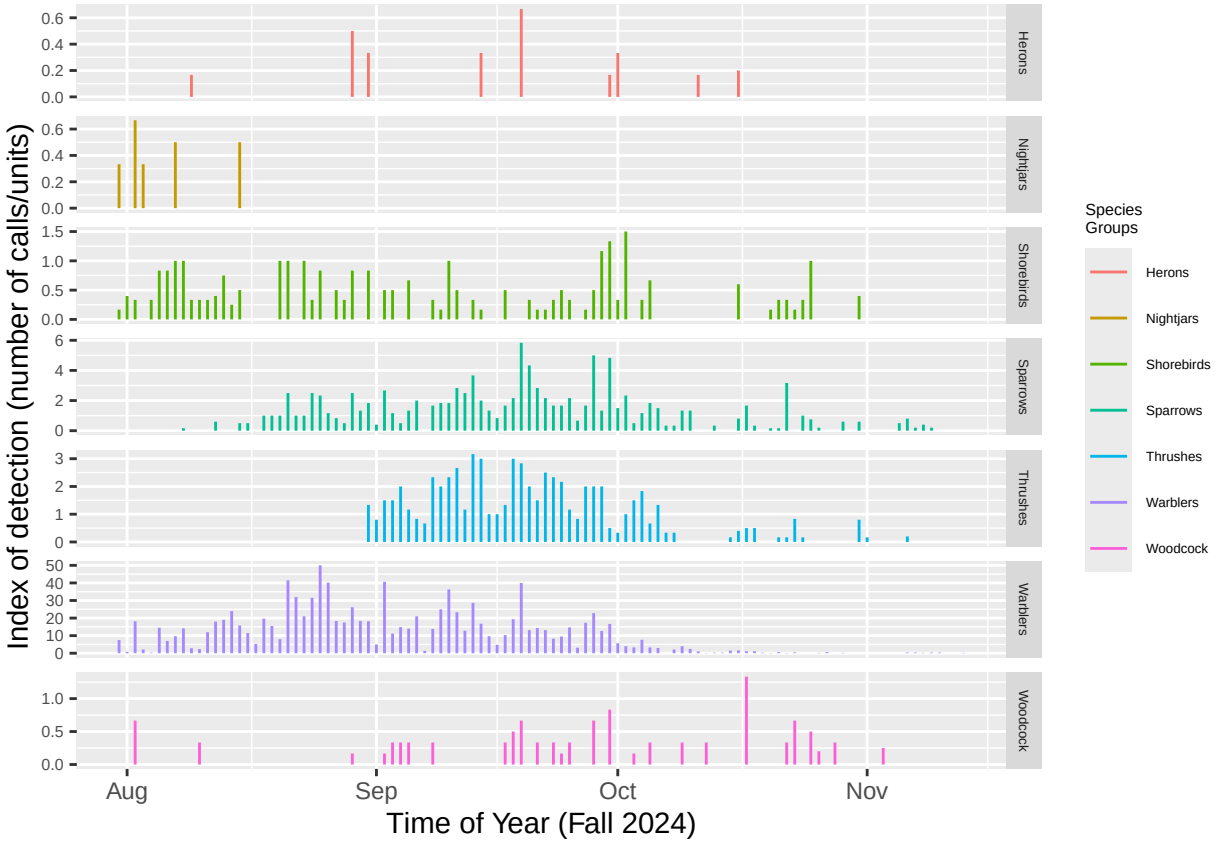


Figure 18: Nocturnal Flight Call Detections by Species Group and Time of Year during Fall 2025

Figure 19 shows the distribution of acoustic detections by species across the Fall. Each dot represents one validated detection for one species. They are plotted on a separate panel for each species, with the time of the detection (relative to sunrise) on the y axis, and the time of year on the x axis. A broader number of species was detected in the Fall, partly because of the longer season, but also because either calling rates are higher in the fall, or birds are flying lower.

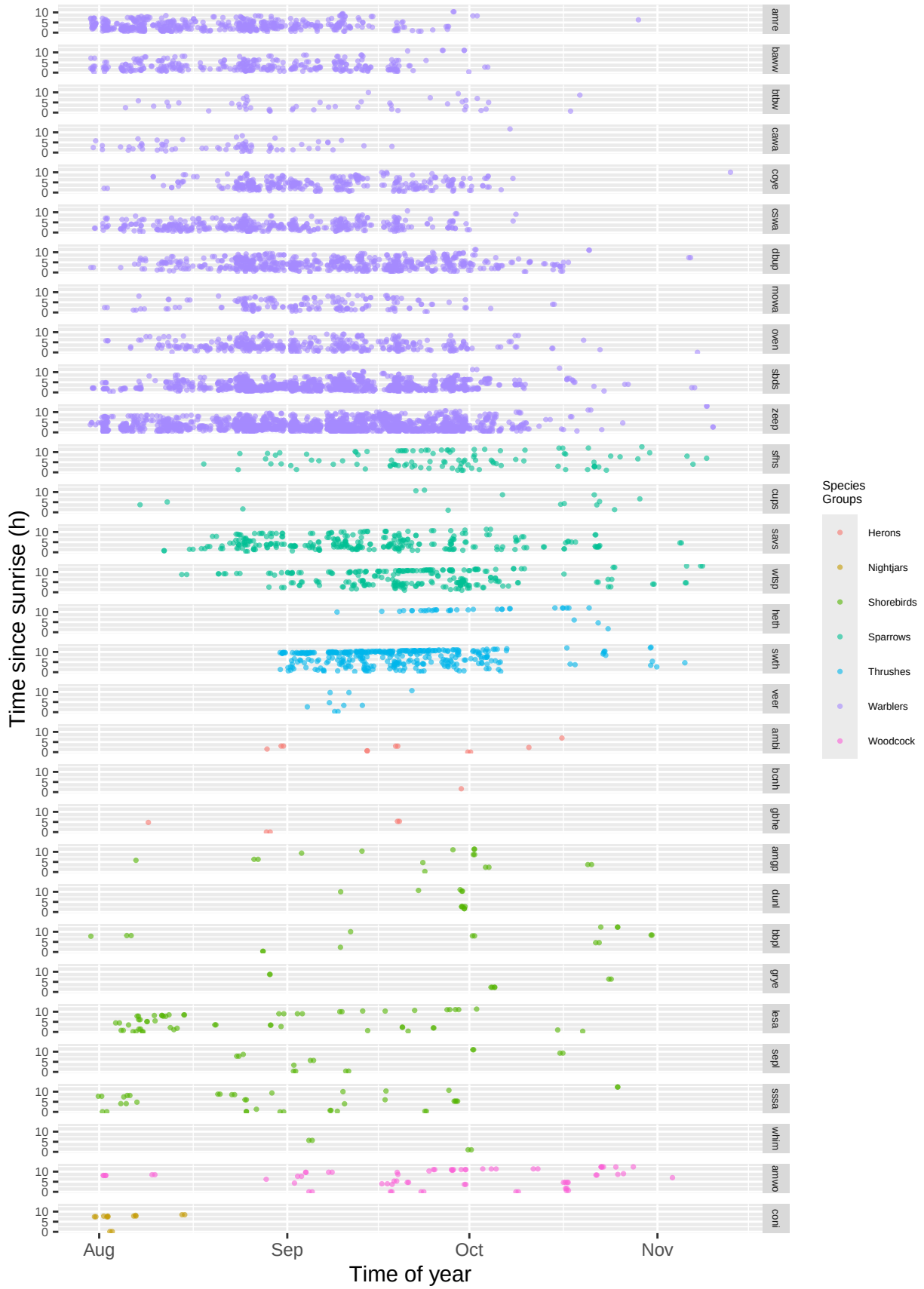


Figure 19: Nocturnal Flight Call Detections by Species Group and Time of Year during Fall 2024

Very few NFCs were detected during November suggesting that the bulk of the migratory season was captured by the audio samling.

4 Summary

Radar and acoustic monitoring was nearly continuous throughout the spring and fall seasons at West Bay. Very few radar targets were or NFCs were detected in March or November suggesting (as expected) that our sampling sufficiently covered the temporal period of bird migration in the area. As is typically seen on similar studies in Nova Scotia, the intensity and duration of the spring migration season is much less compared to the fall.

Targets were detected at various heights throughout the area sampled (i.e., between 70 m and approximately 800 m). Given that the probability of detecting small birds decreases as distance from the radar increases, the decrease in number of detections of birds higher than 400-600 m likely results from both fewer birds aloft and a decreased detectability.

Most radar and acoustic activity was observed during the middle portion of the night. While some portion of migrants are likely stopping over at the Project Area, the consistency in distribution of night migration activity suggest that a large proportion of migrants observed are not using the Project Area for staging during migration. However, it is possible that migrants are landing in the project area earlier in the night.

Most activity was observed when favourable tailwinds were present and with little to no precipitation. These findings are consistent with other radar and acoustic studies completed in Atlantic Canada (e.g., Peckford and Taylor 2008) and elsewhere (Shamoun-Baranes et al. 2017).

The composition of the species detected via acoustic sensors were consistent with the range of species known to migrate into and through the Atlantic Provinces in the spring and fall. The timing of those species was also as expected, with most warblers detected between mid to late May and August to early September, and sparrows observed throughout May and September through October. Very few NFCs were detected at the beginning and end of each season, which suggest that monitoring capture the majority of bird migration.

4.1 Limitations

The following are limitations related to the data collected that should be considered when drawing conclusions from the data presented within this report.

4.1.1 Radar Data

Radar data can provide a good understanding of nocturnal avian migration trends at proposed wind energy project sites. However, there are limitations to how the data are collected and can be interpreted, such as:

- While it is assumed that most targets are migratory birds, some proportion of targets may be from insects, bats, clutter and or precipitation. Our methods attempt to maximize bird detections and minimize detections from other sources (particularly clutter and insects) but directly assessing how well these methods work is very difficult or impossible.
- Species identification using radar alone is not possible.
- As distance from the radar increases, the detection probability of small (i.e., passerine sized) targets decreases. Because we know migration density decreases with increased altitude, the interplay between detection probability and migrant behaviour is difficult to measure.
- Detections at very low altitudes (i.e., below 70 m) are difficult to capture due to topography and tree cover which cause clutter in the radar signal.

4.1.2 Acoustic Data

While NFC calling rates provide a good representation of migratory activity (e.g., species present, trends in activity), there are many factors that influence calling rates; several of which are:

- Microphone sensitivity (detection rates may change based on weather, background noise, vegetation cover, and technology).
- Time of year (it is unknown how calling rates vary with time of year and species).
- Time of night (calling rates may be higher during the early portion of the night to entice stopovers to initiate migratory flight, or in the morning, when individuals are choosing to land for the day). The influence this has on detection rates is poorly understood.
- Weather conditions (it is unknown how weather conditions may impact calling rates).
- Density of migrants (it is unknown if calling rates increase or decrease with increased migrant density).
- Species composition (while it is known that not all species call, the calling frequency is known for many species that do produce NFCs).

5 Closure

This work was performed in accordance with the agreement between TCL and CBCL, dated June 2025. This report has been prepared by TCL, based on fieldwork conducted by TCL, for the sole benefit and use by CBCL. The findings presented herein should be considered within the context of the scope of work and Project terms of reference, and are generally only relevant to the current time period.

Report prepared by:

Phil Taylor, President Tabanid Consulting Ltd. Gaspereau, Nova Scotia

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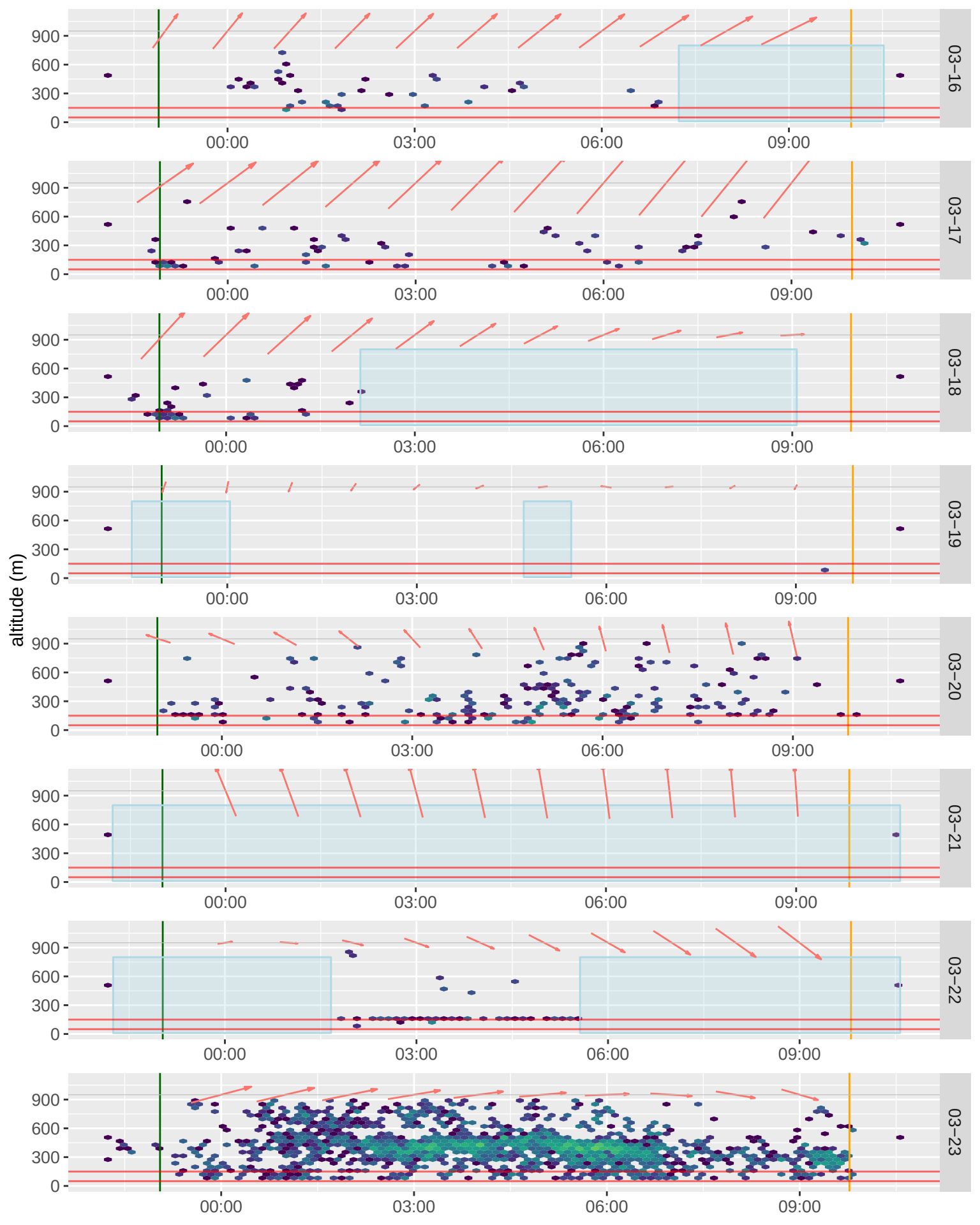
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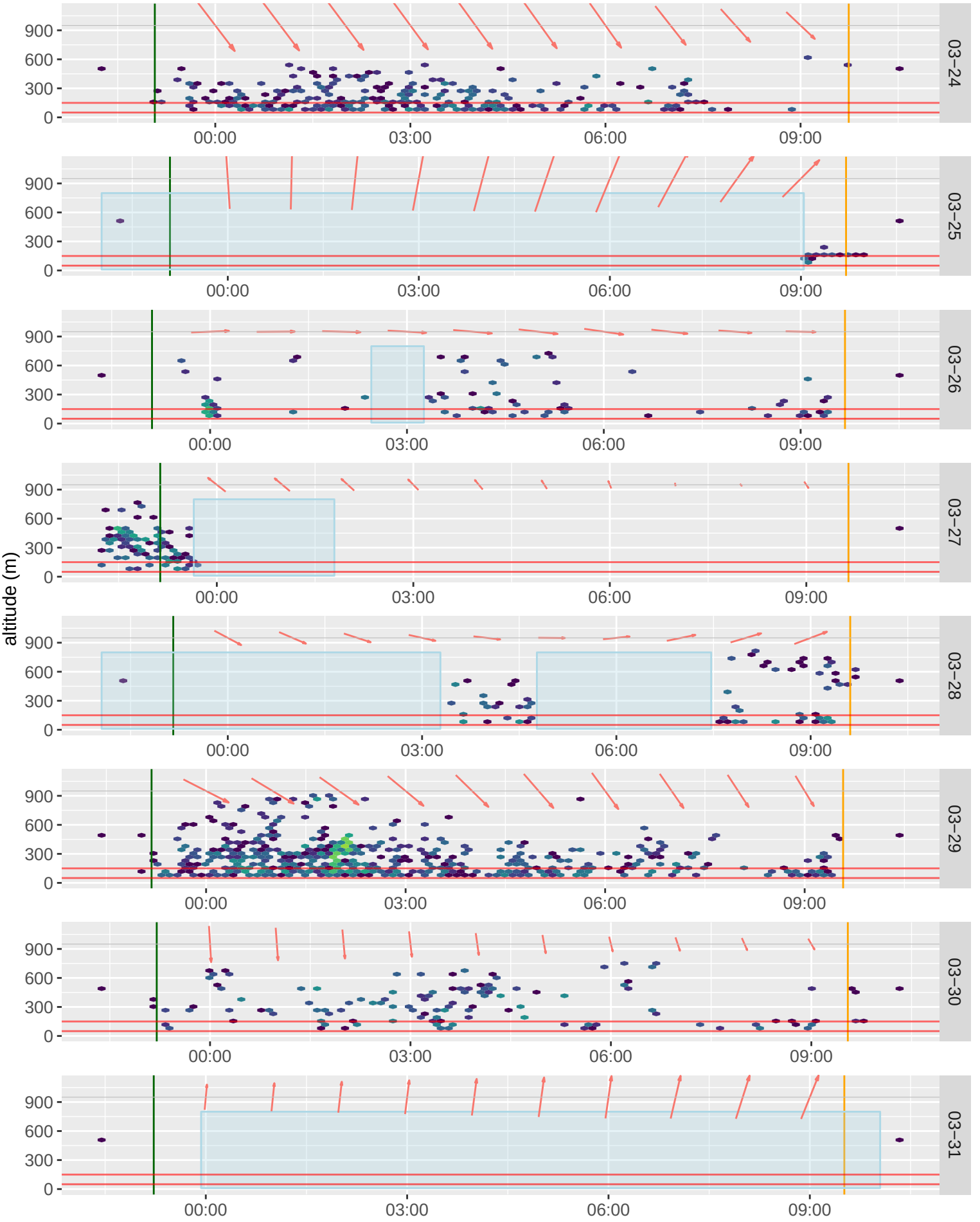
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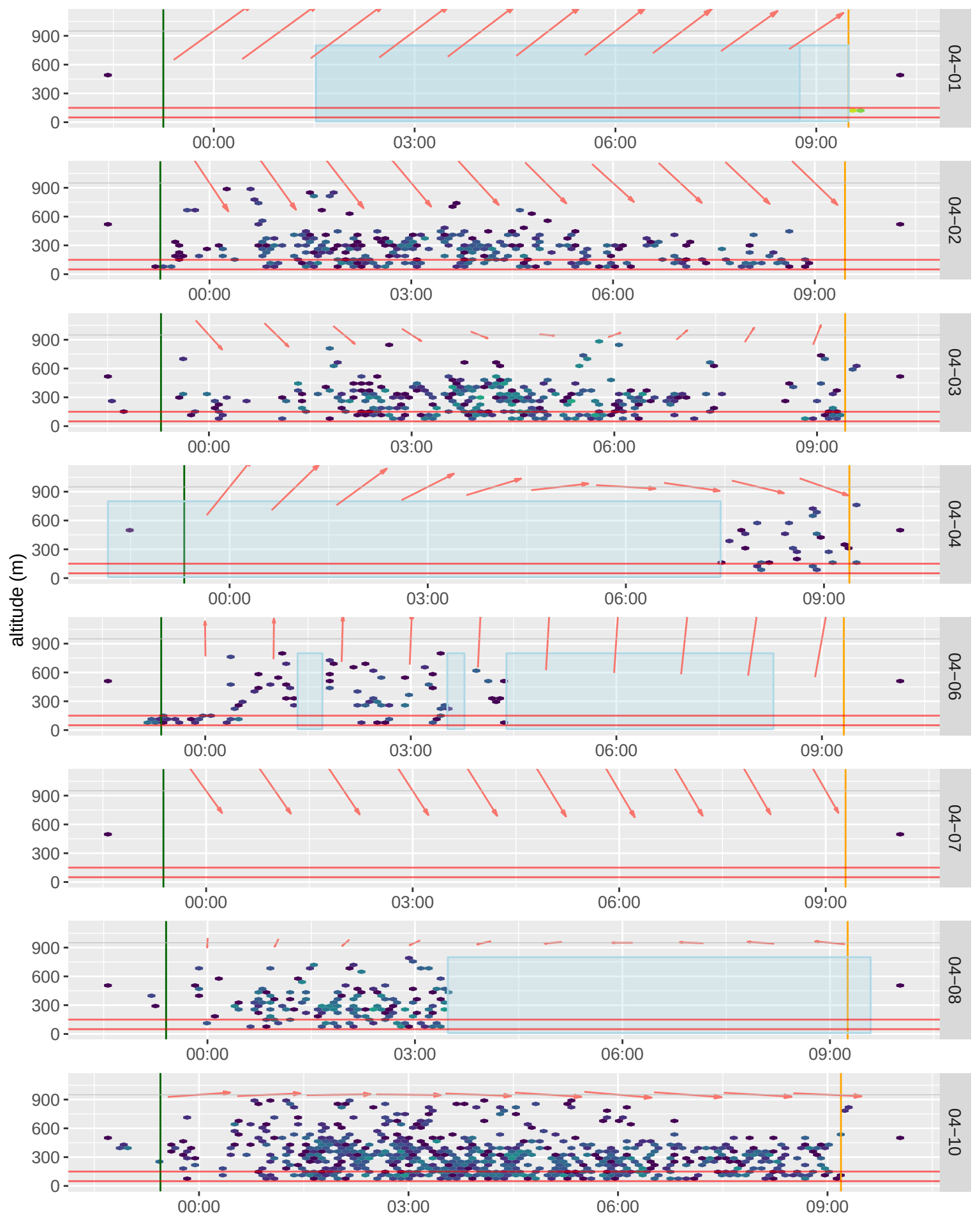
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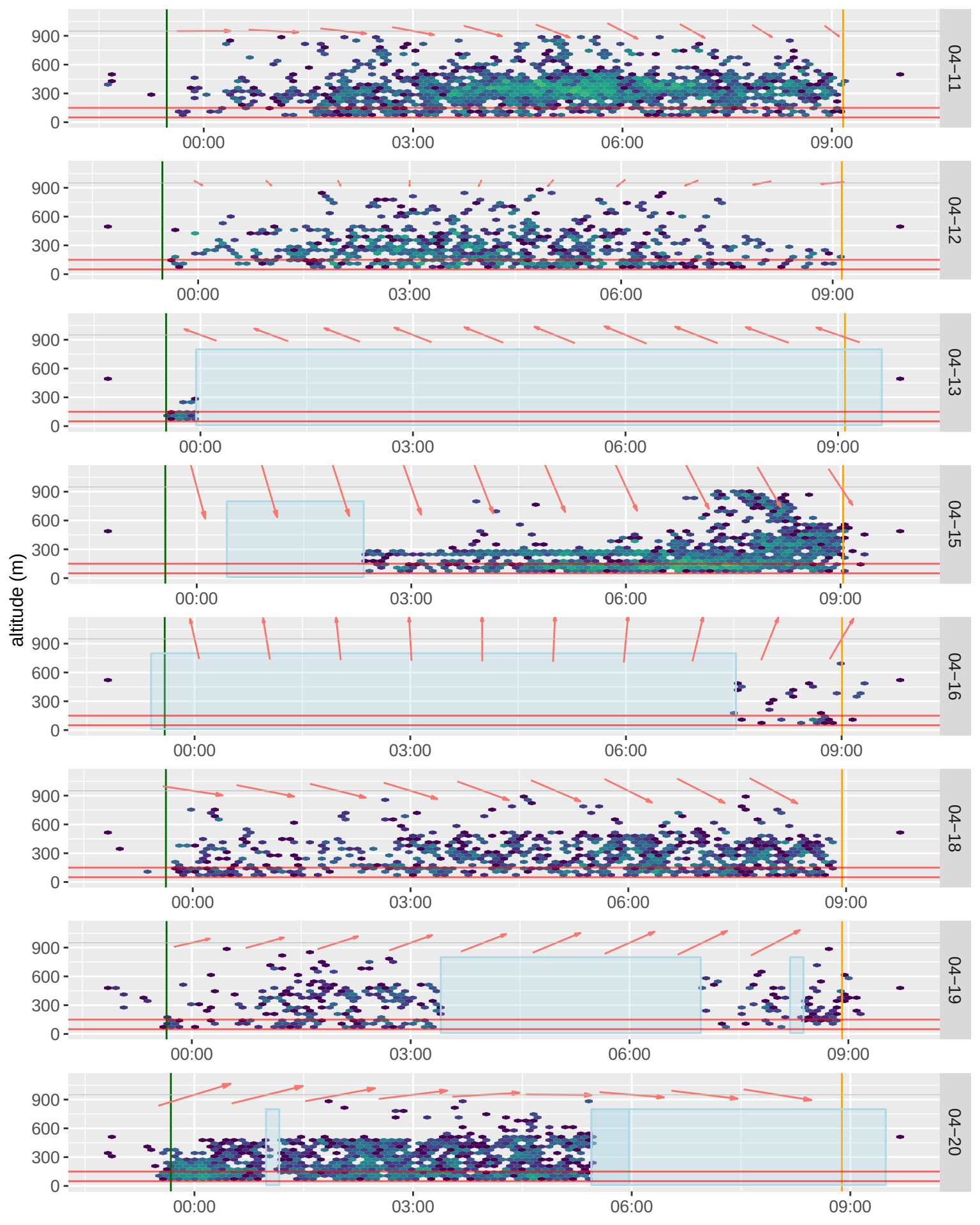
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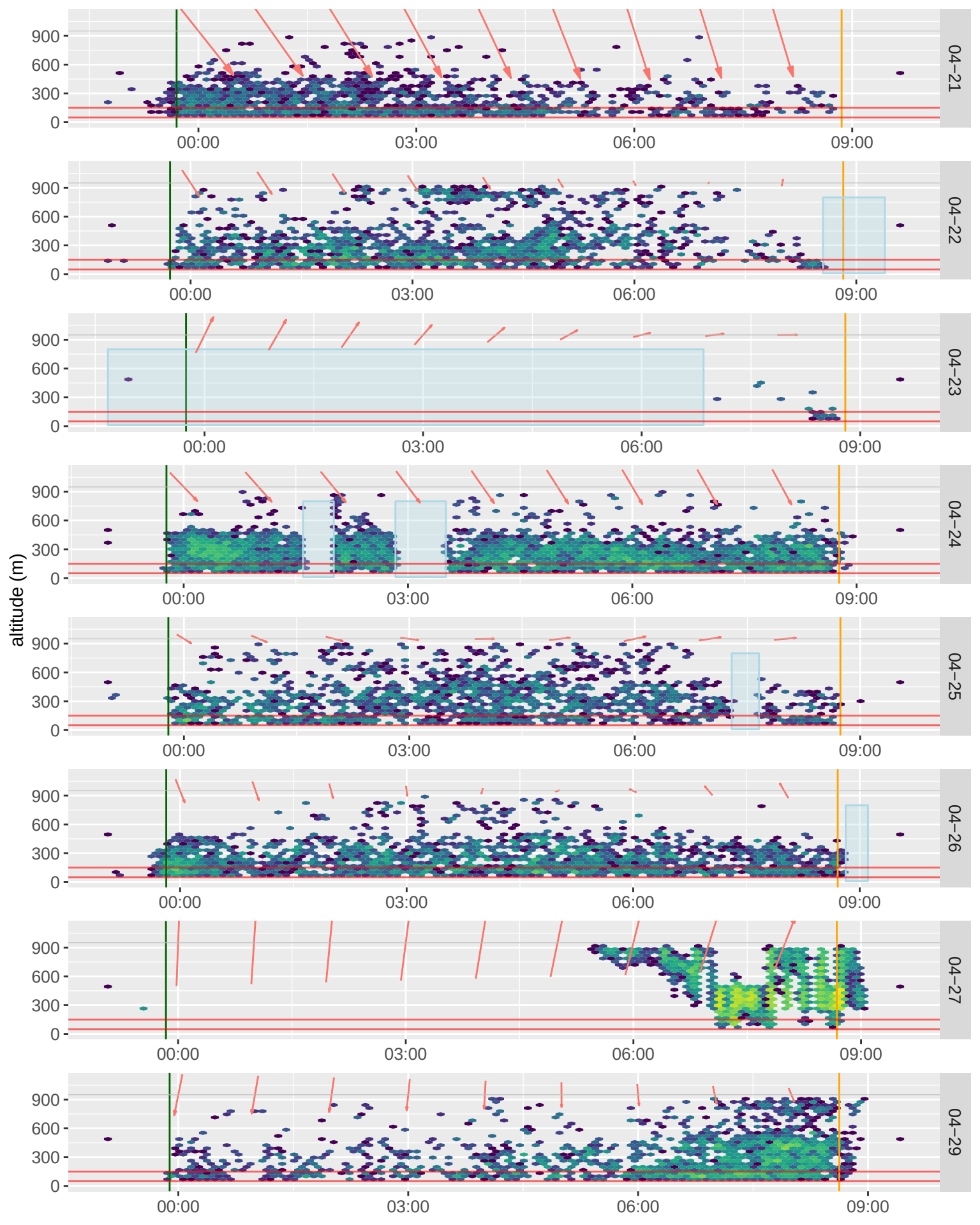
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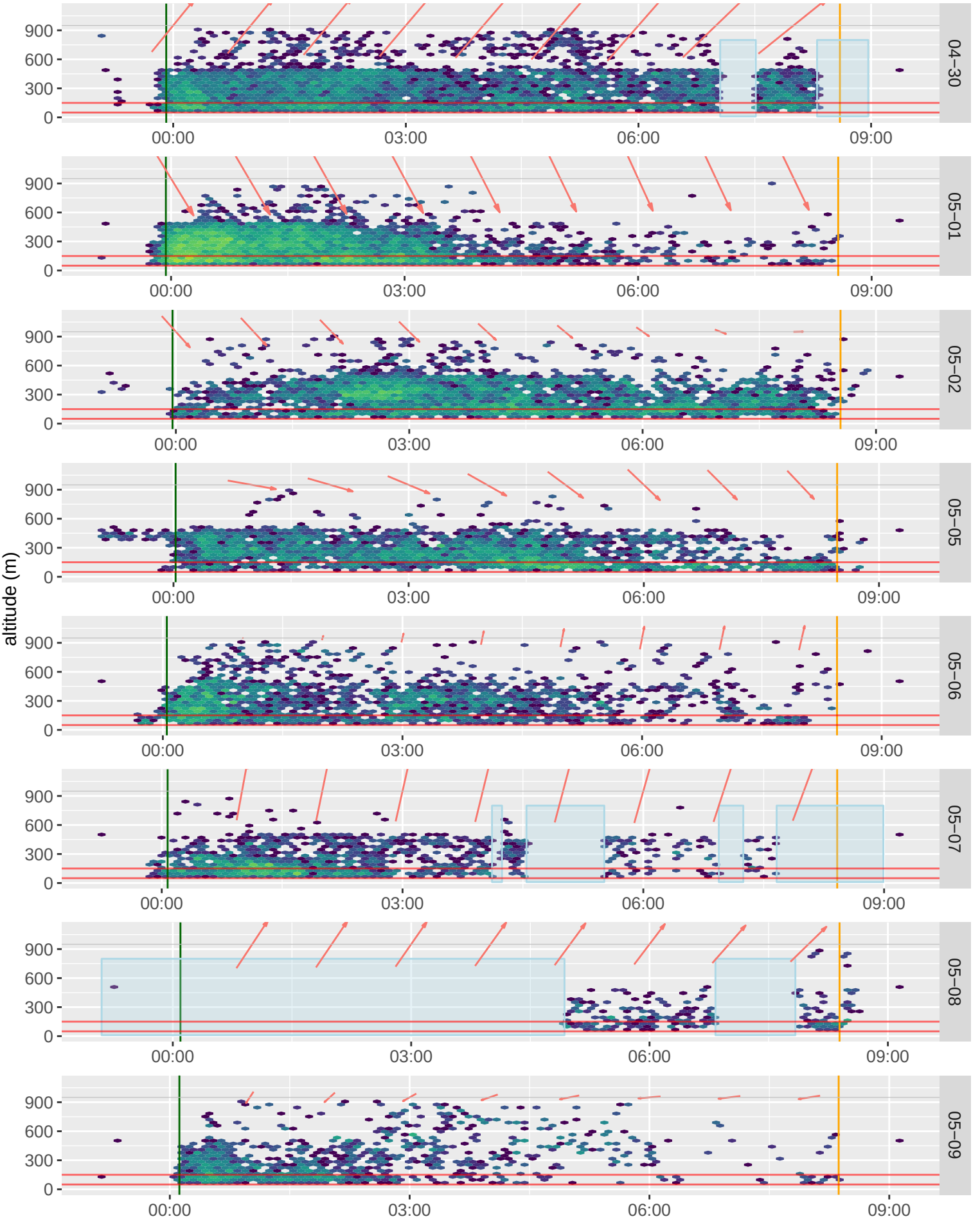

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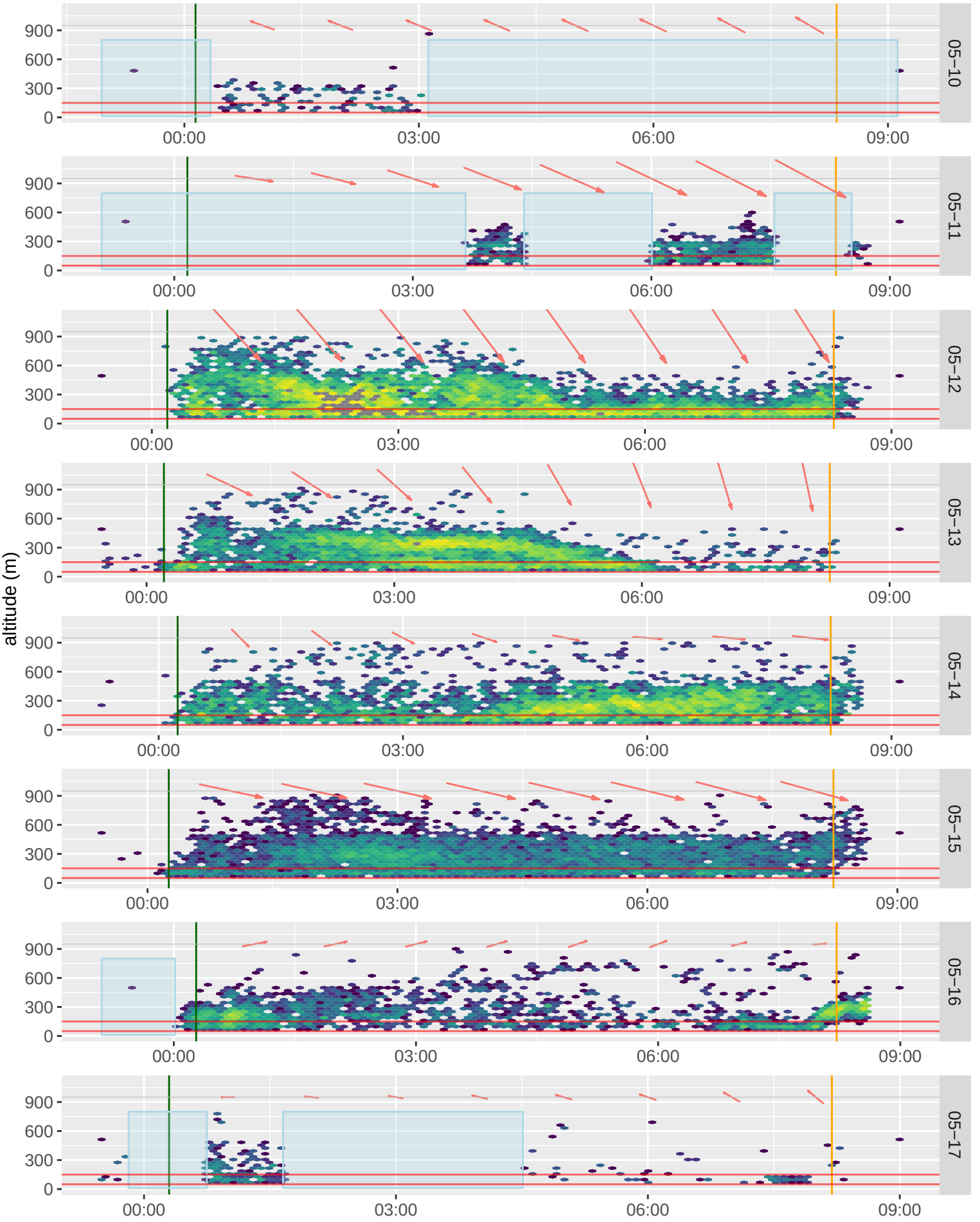

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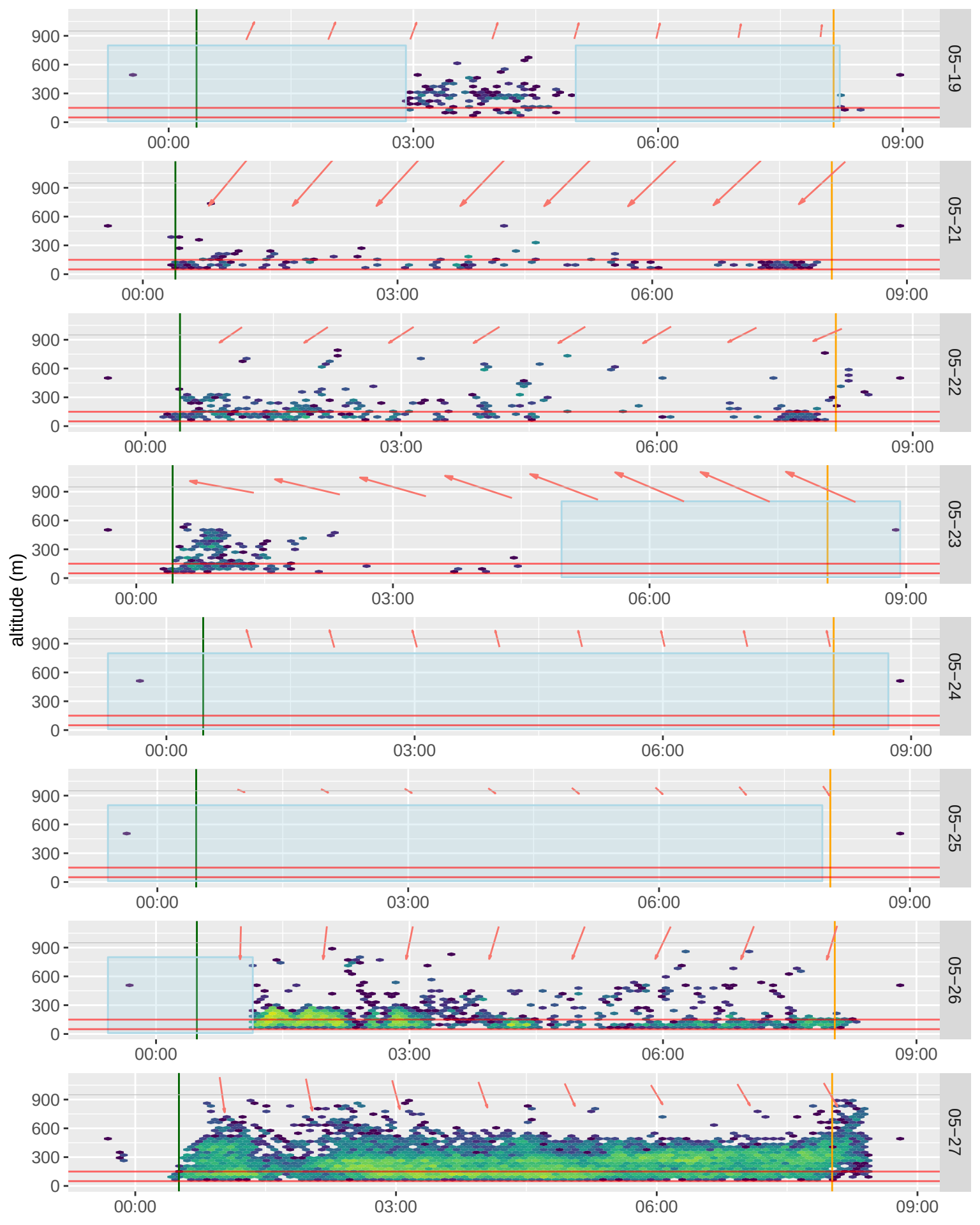

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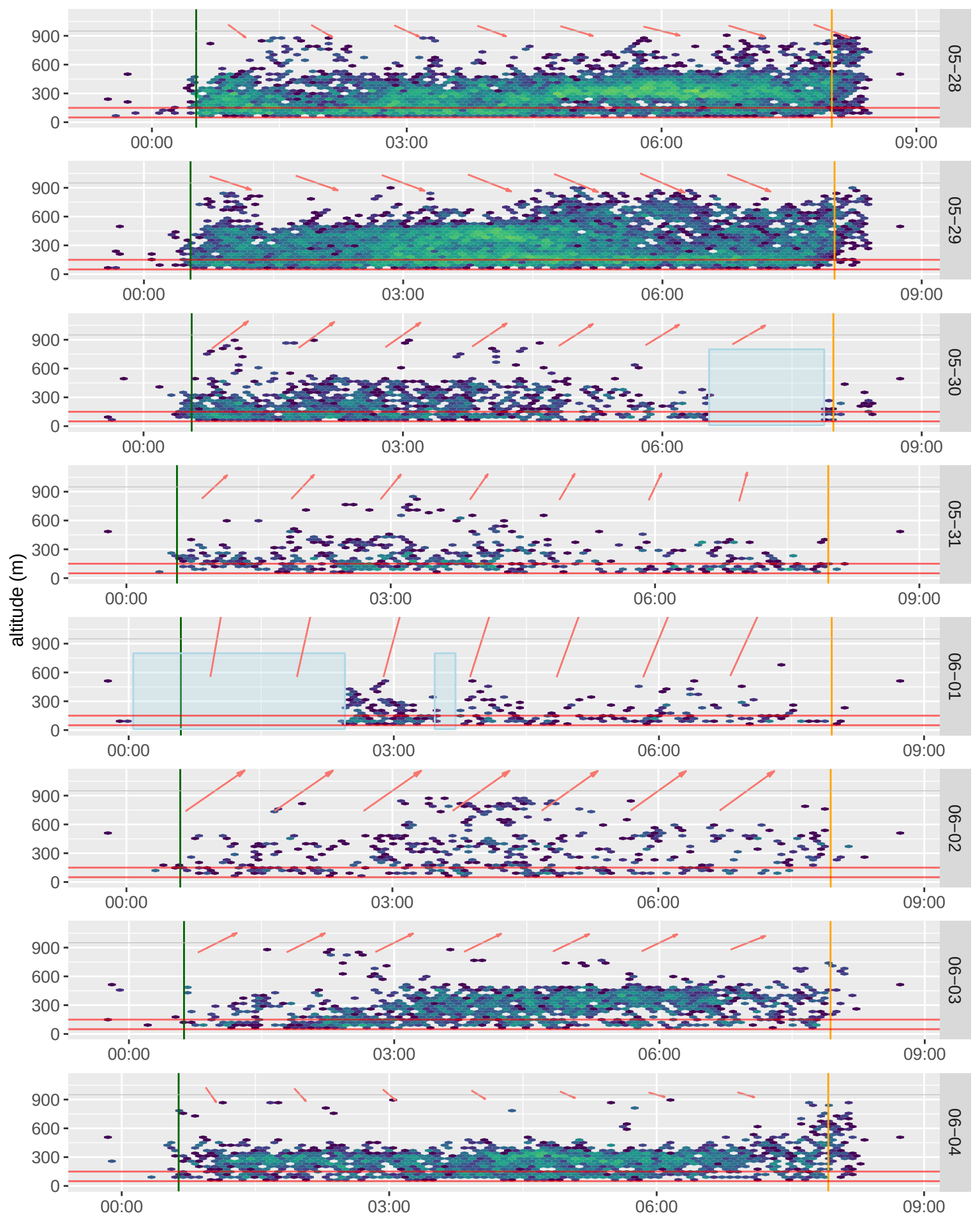

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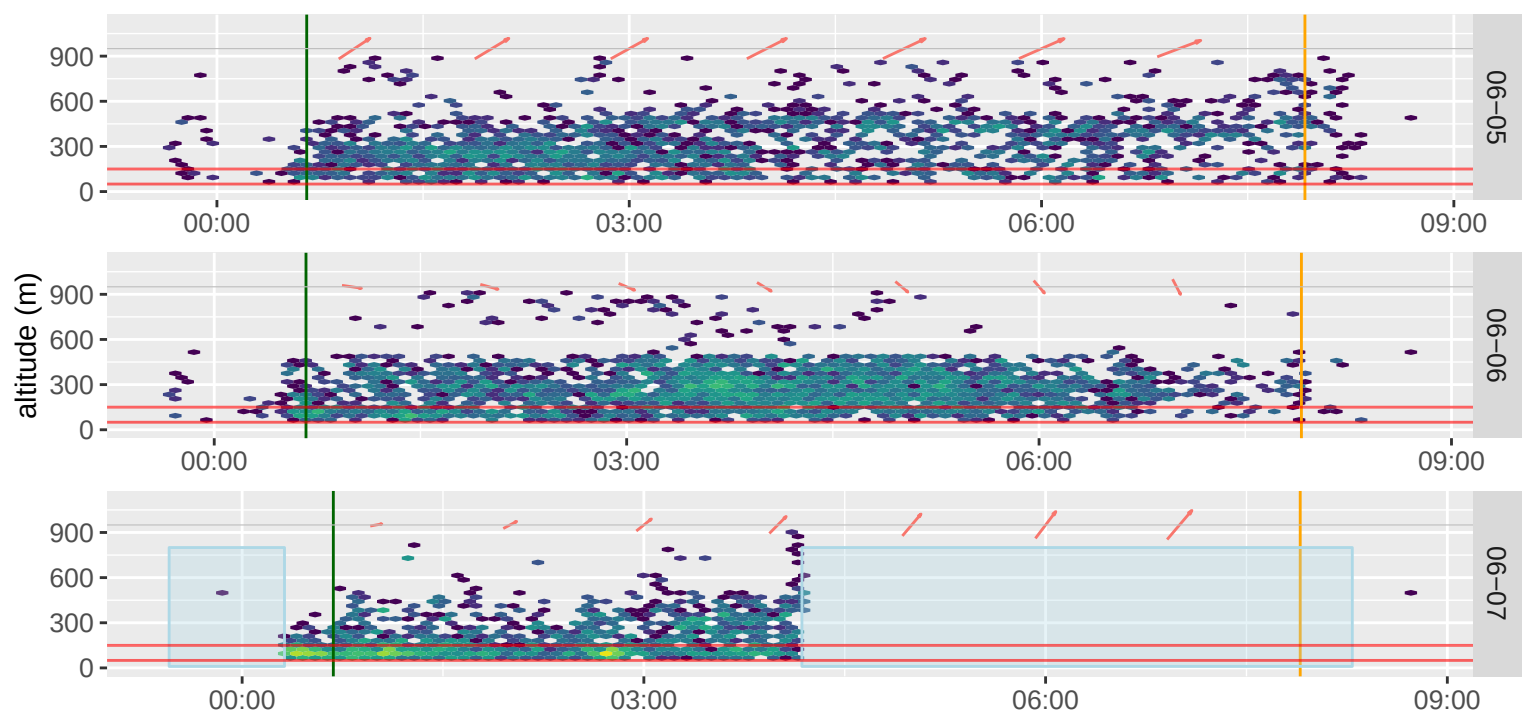

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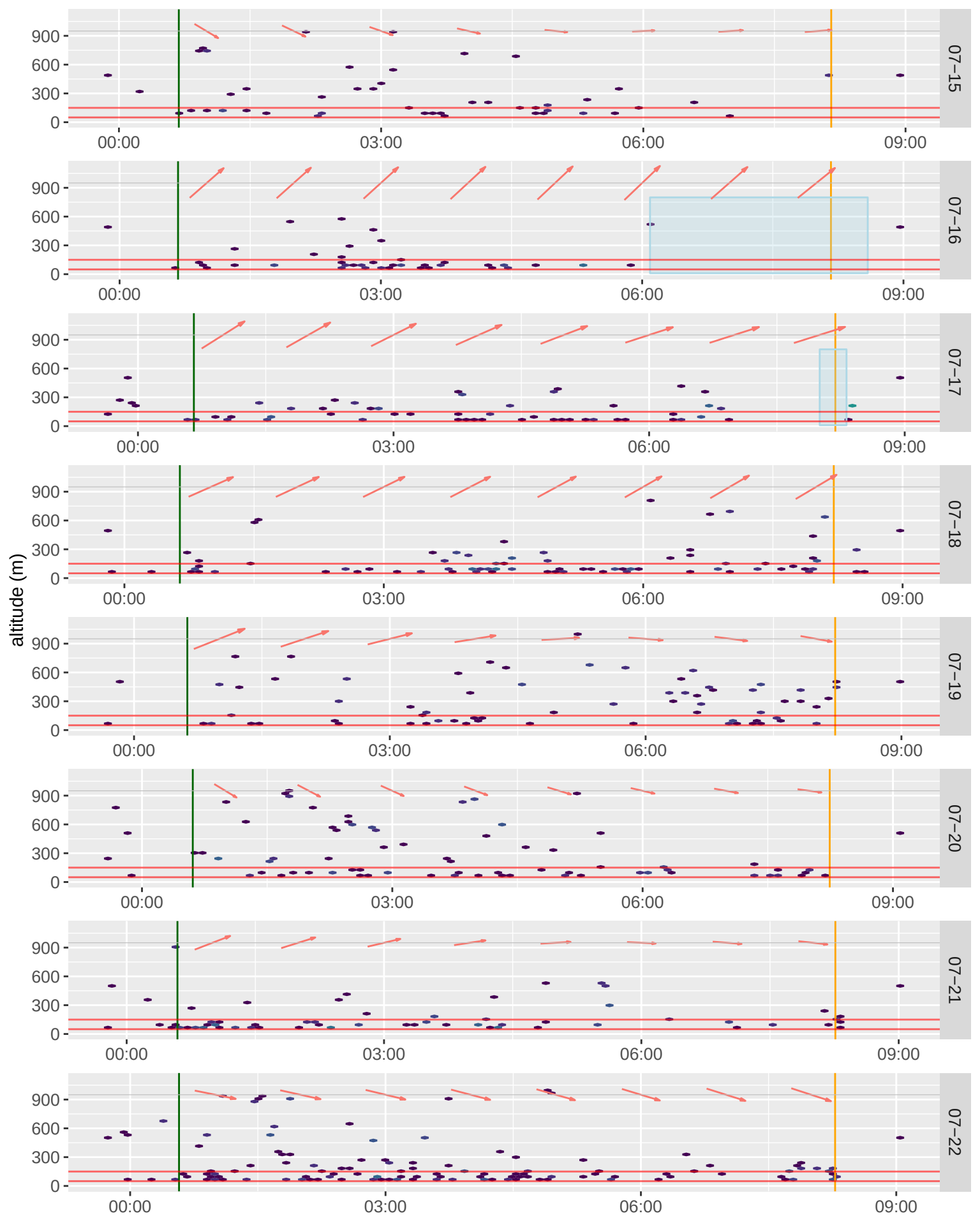

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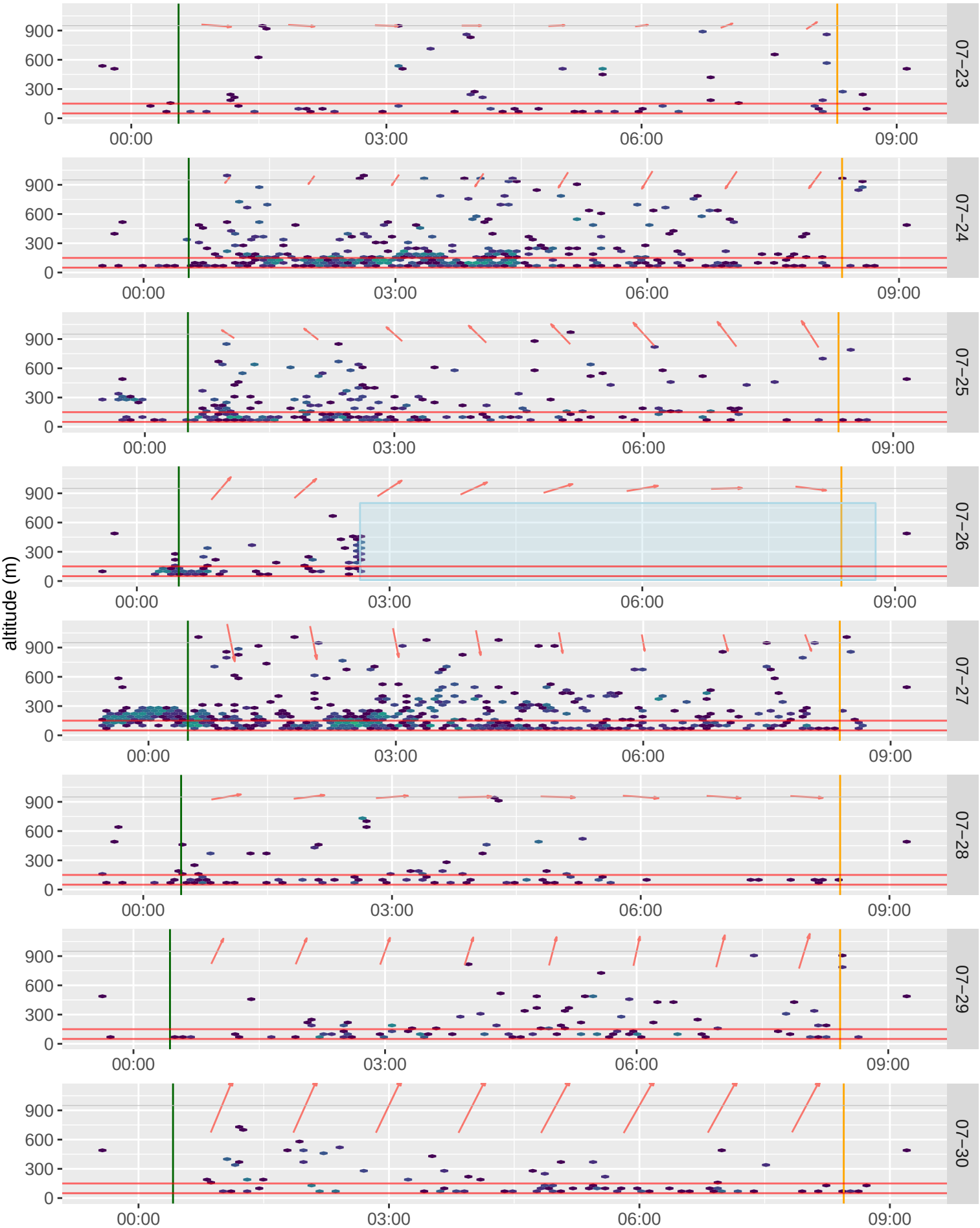

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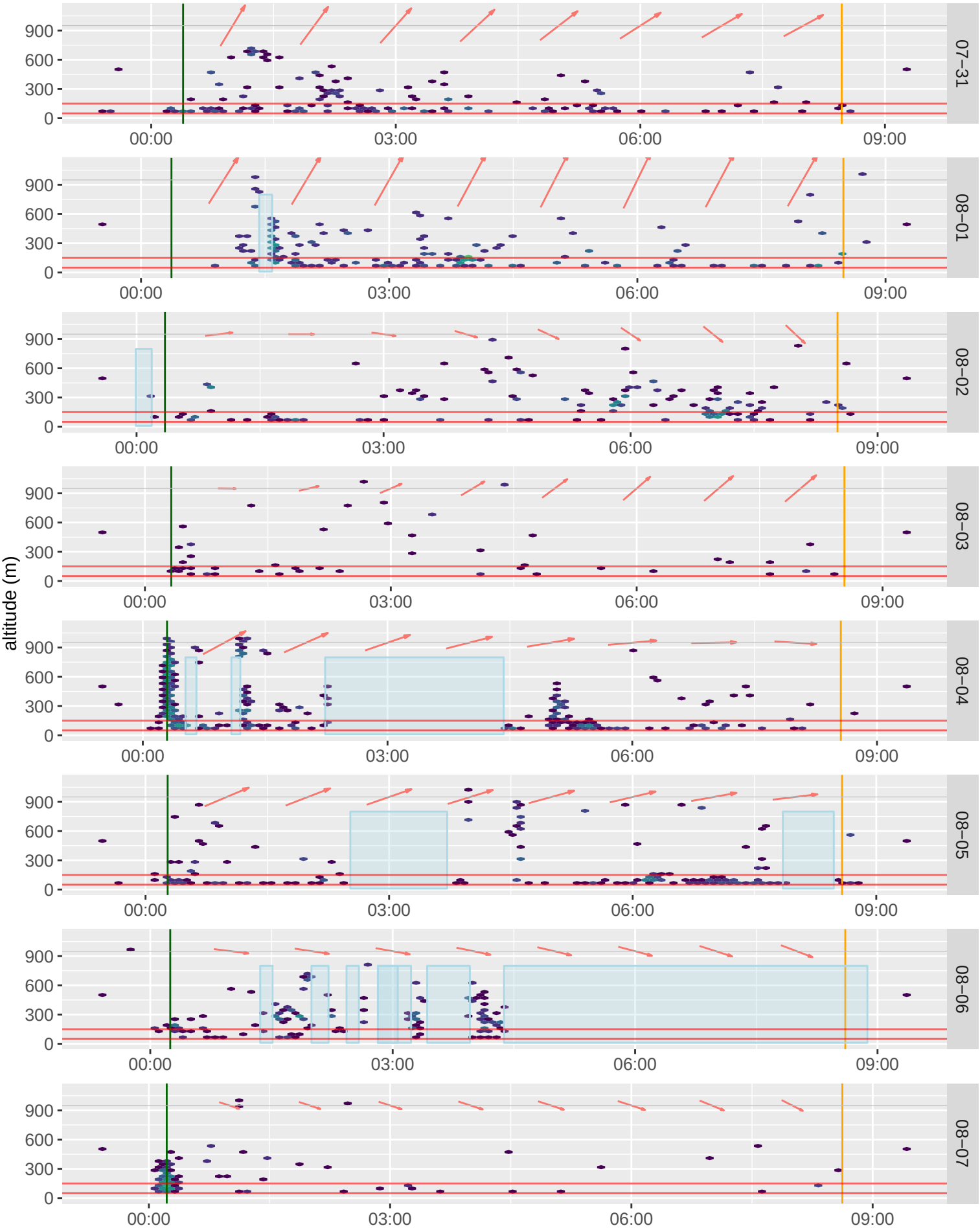

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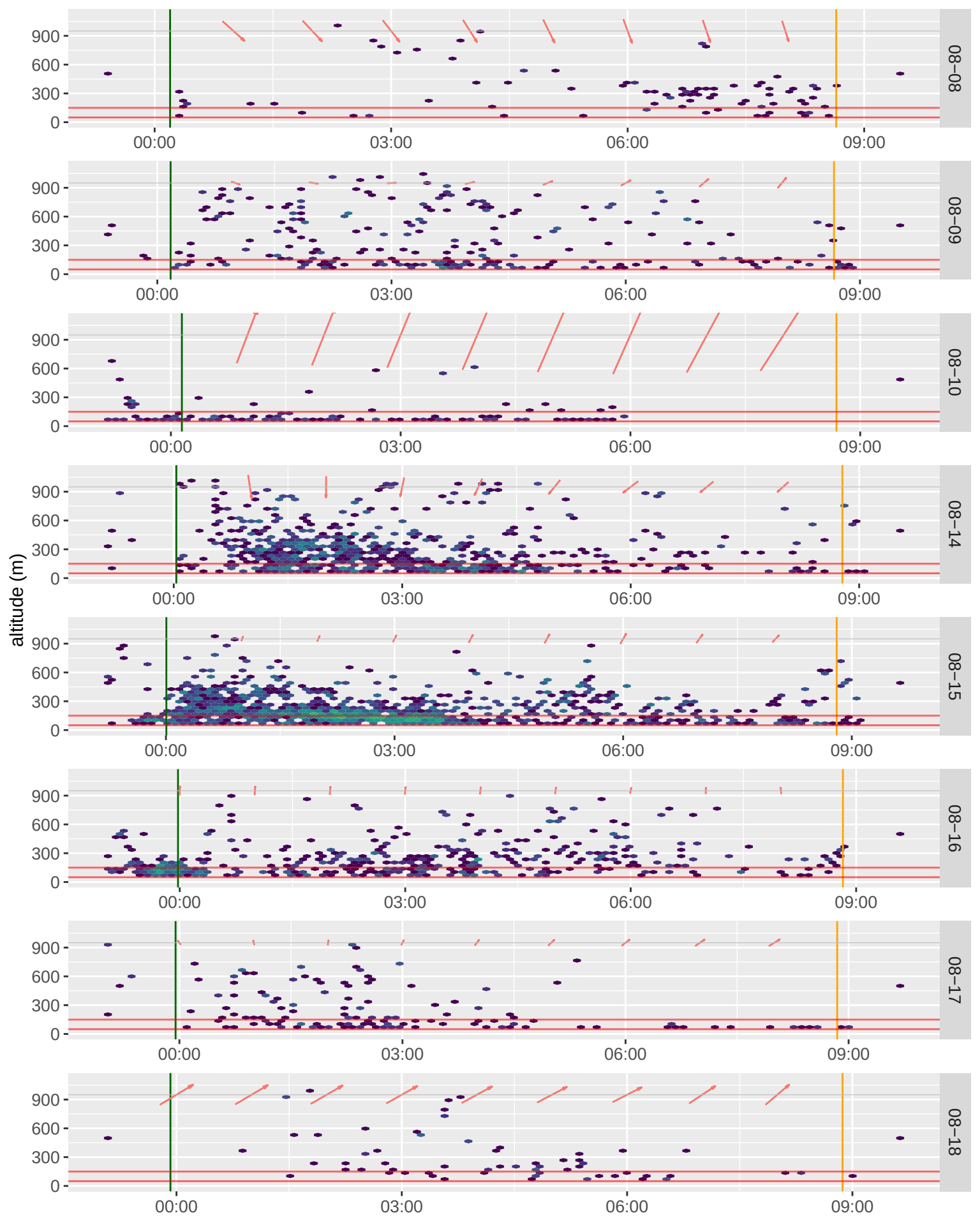

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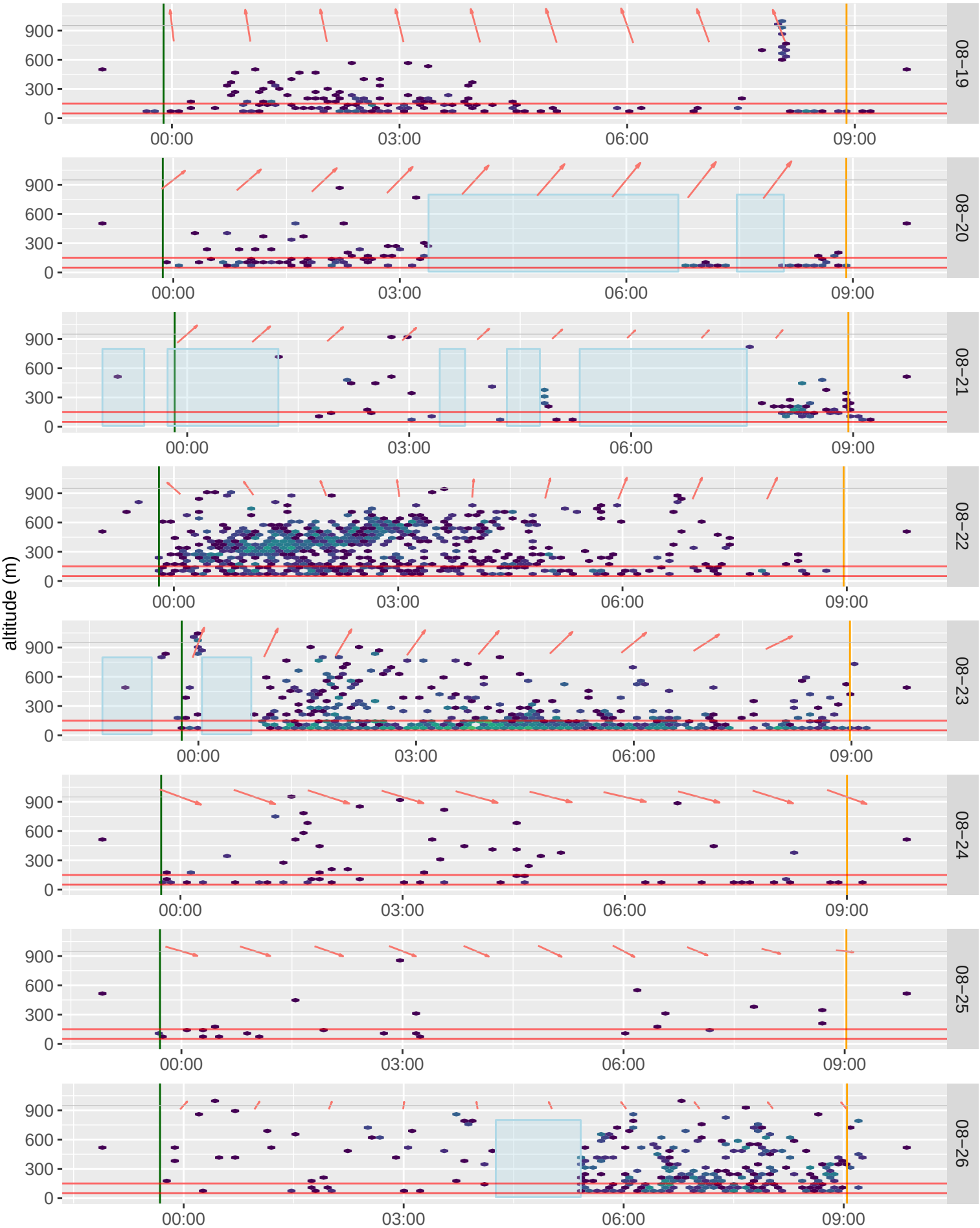

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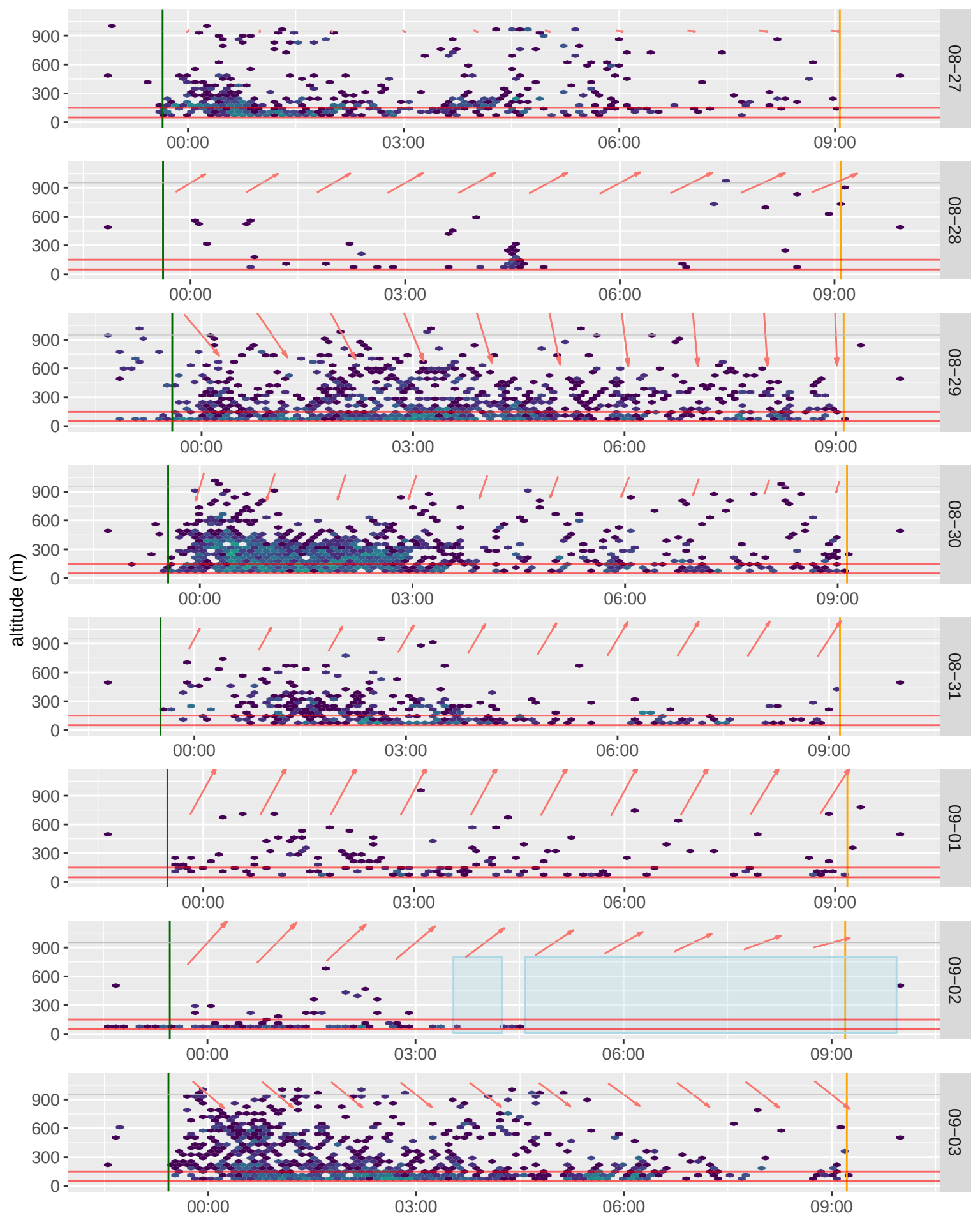

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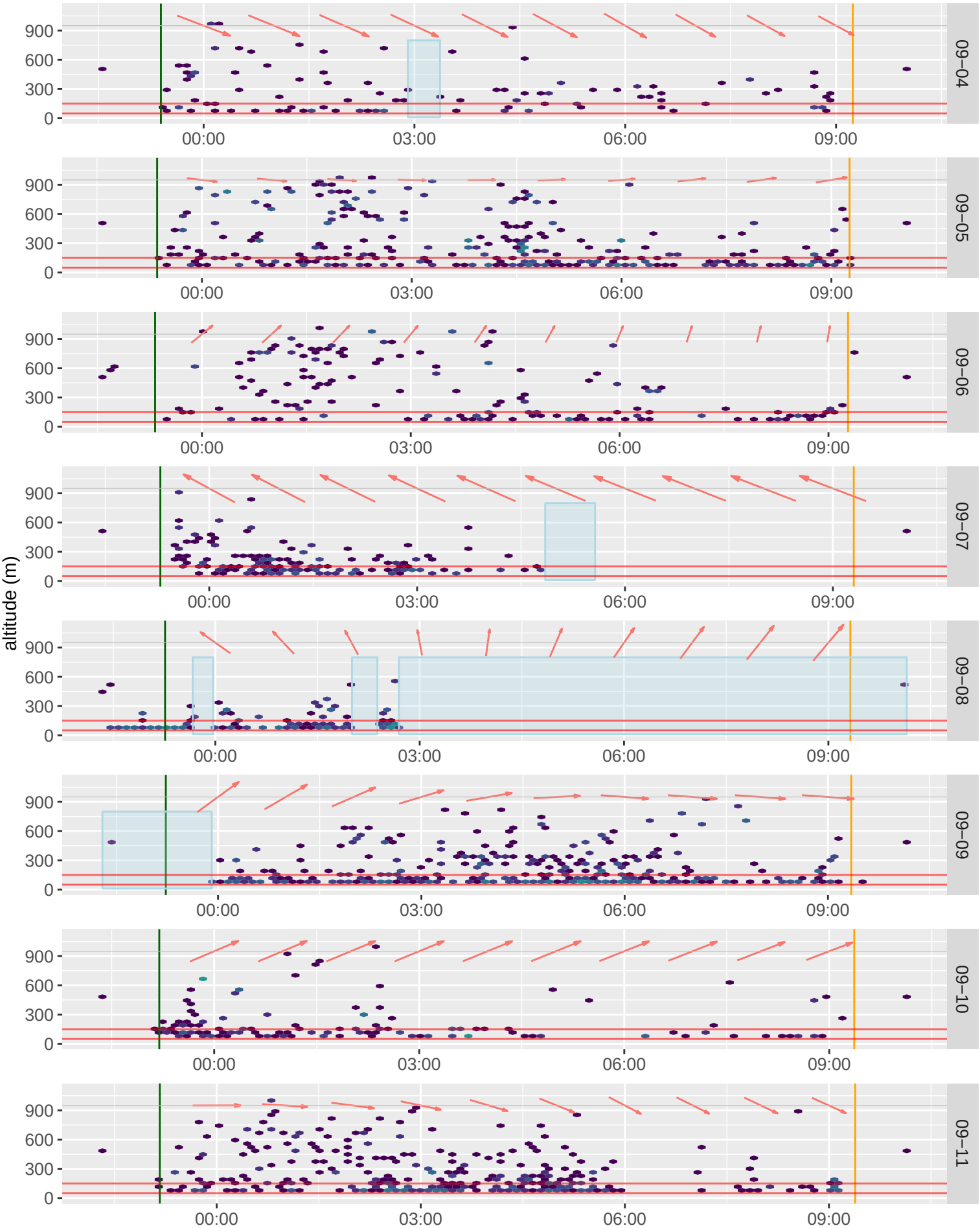

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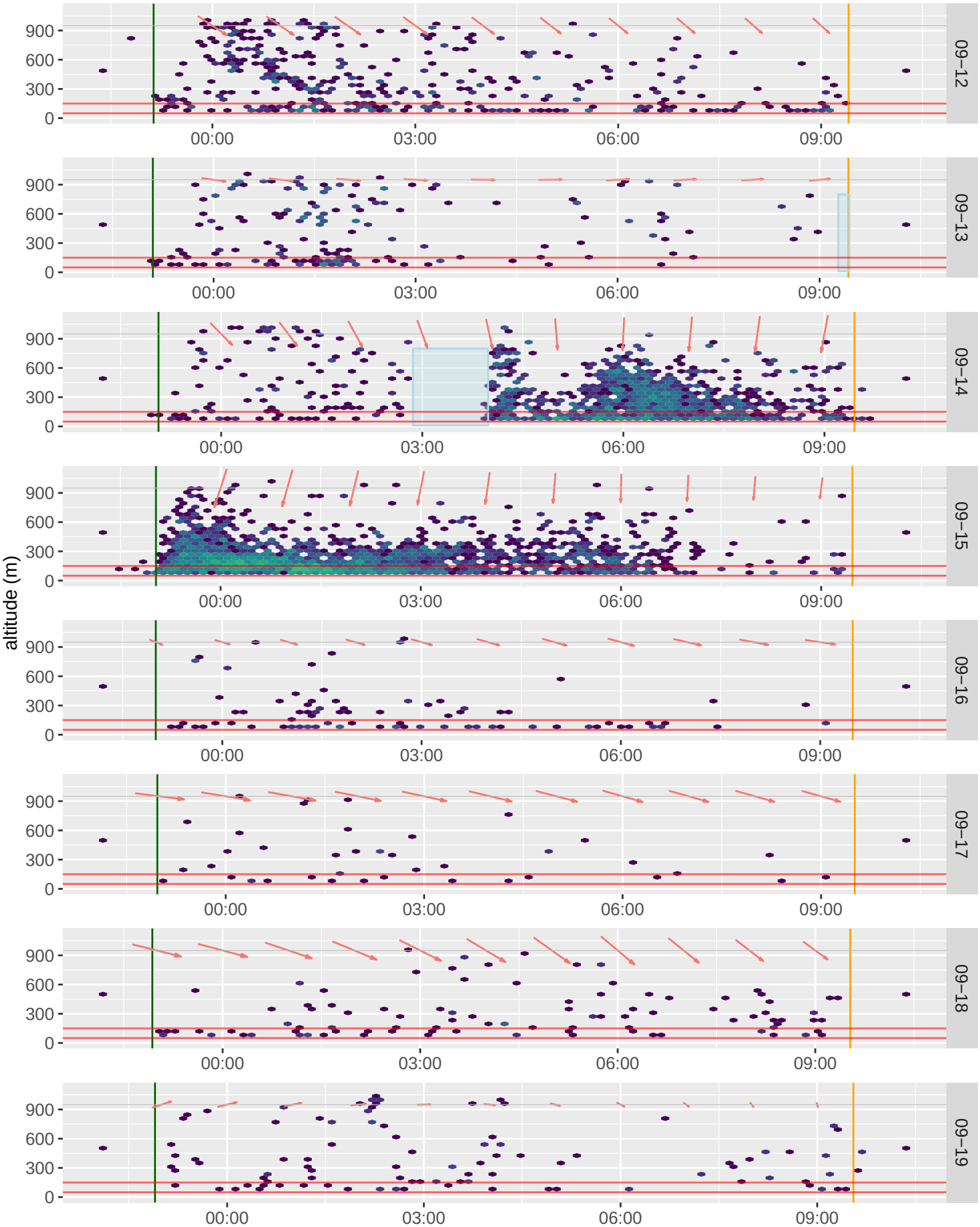

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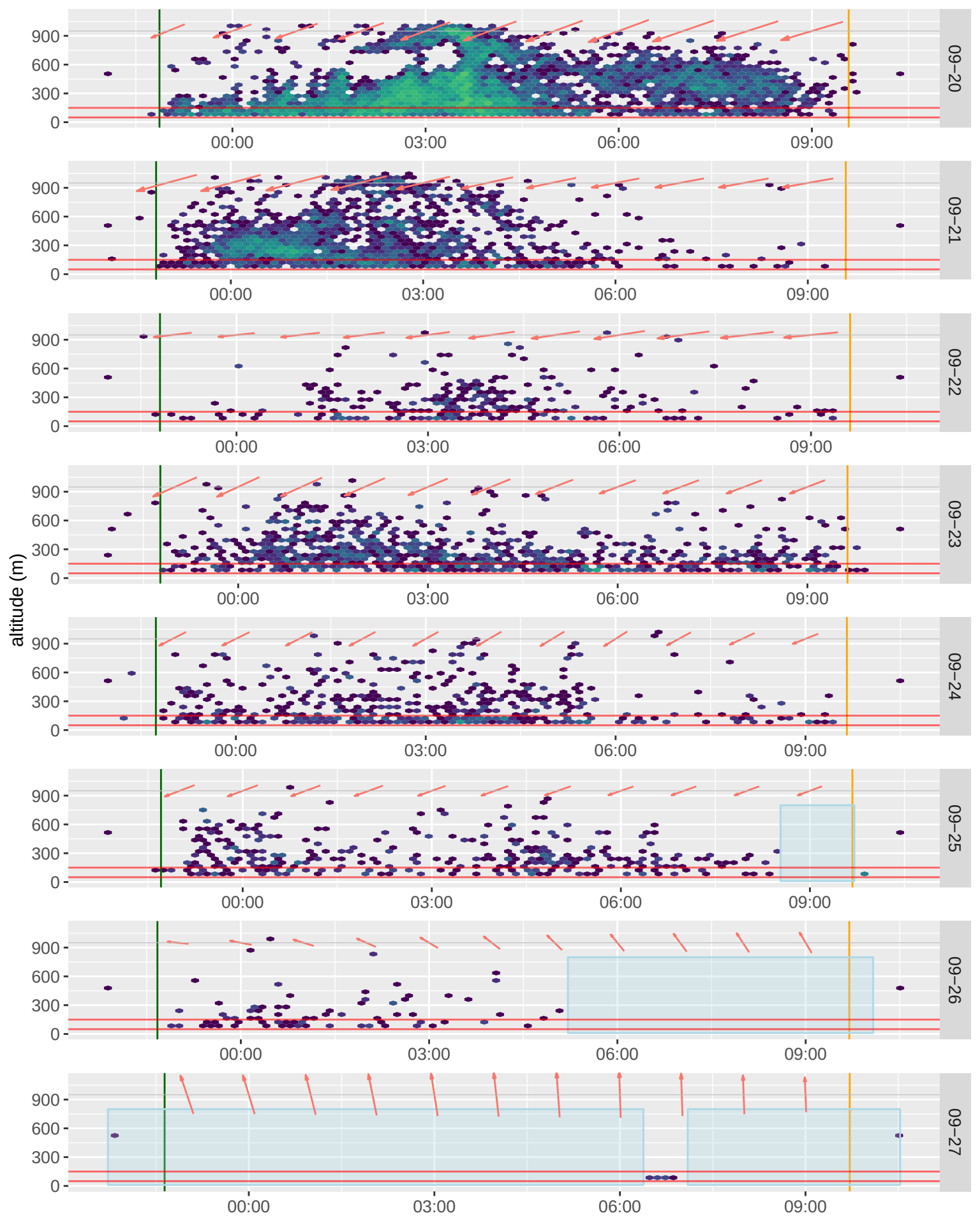

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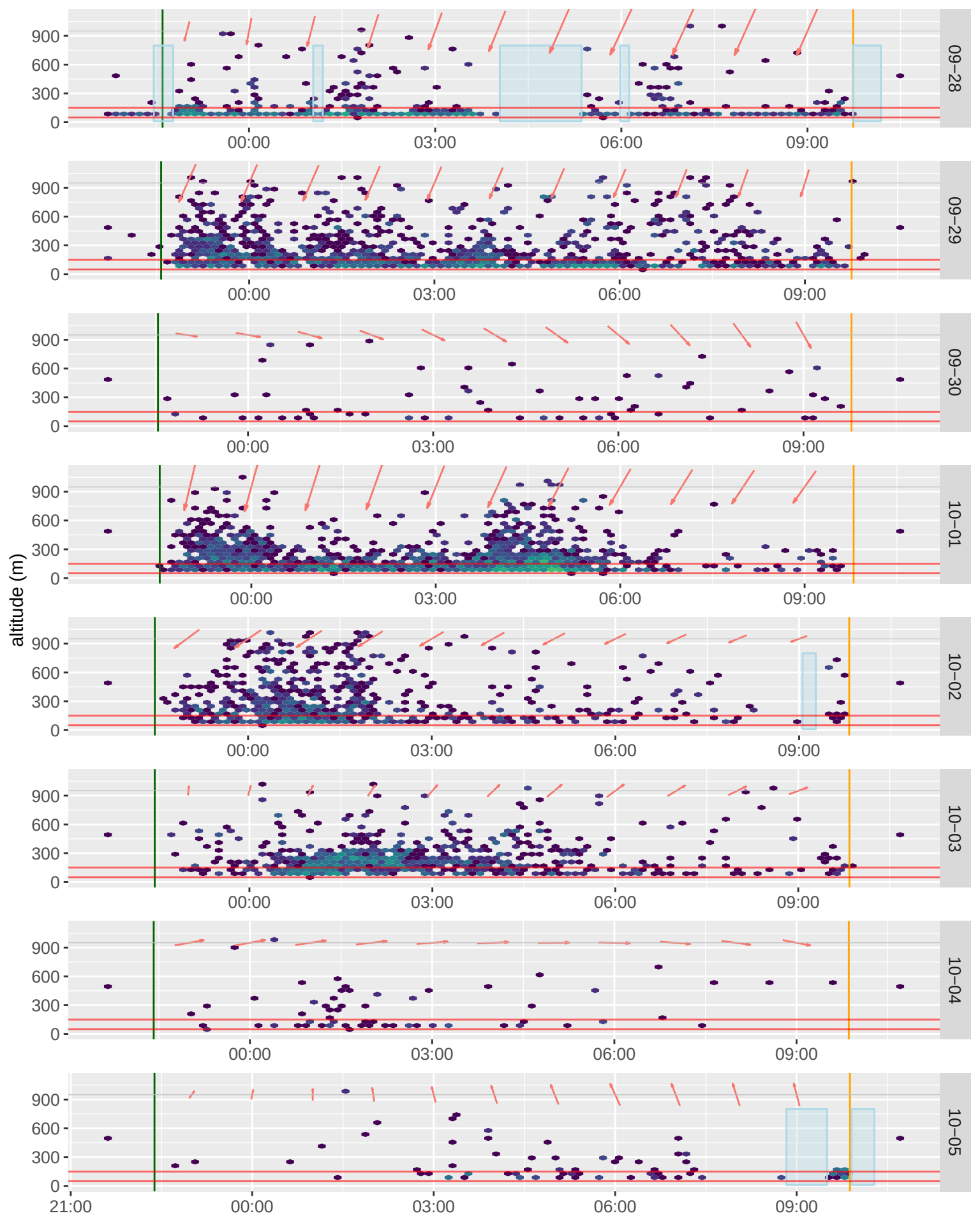

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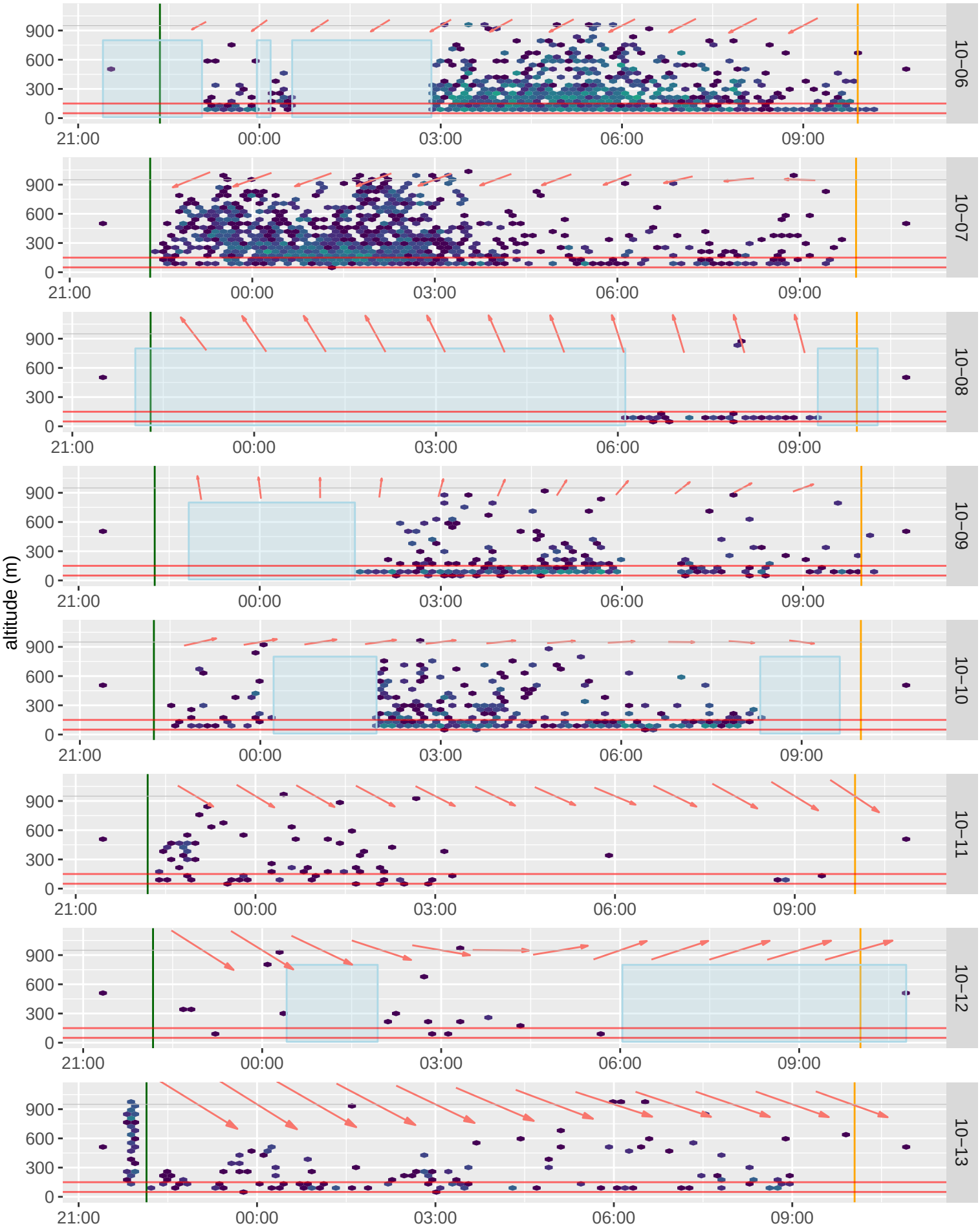

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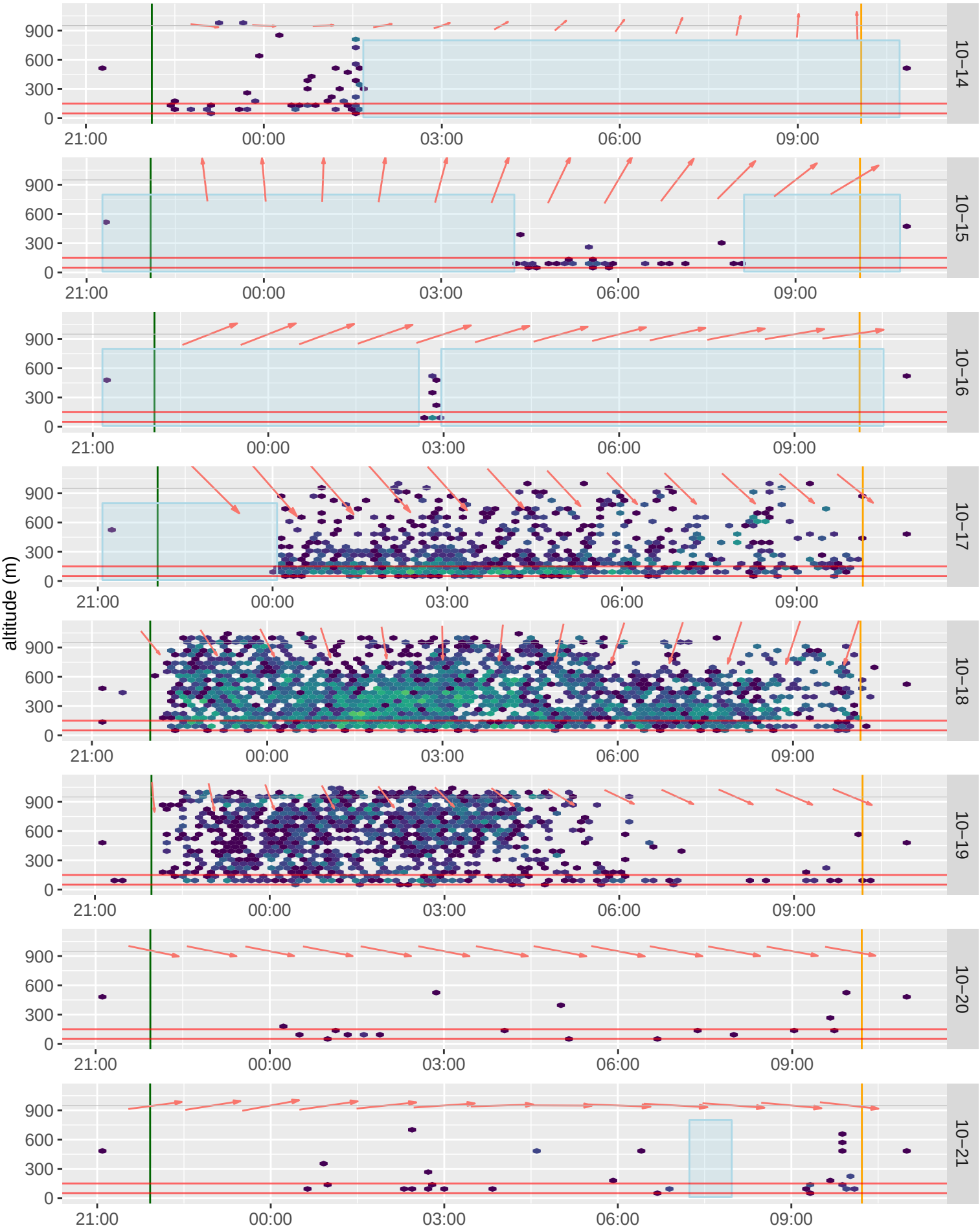

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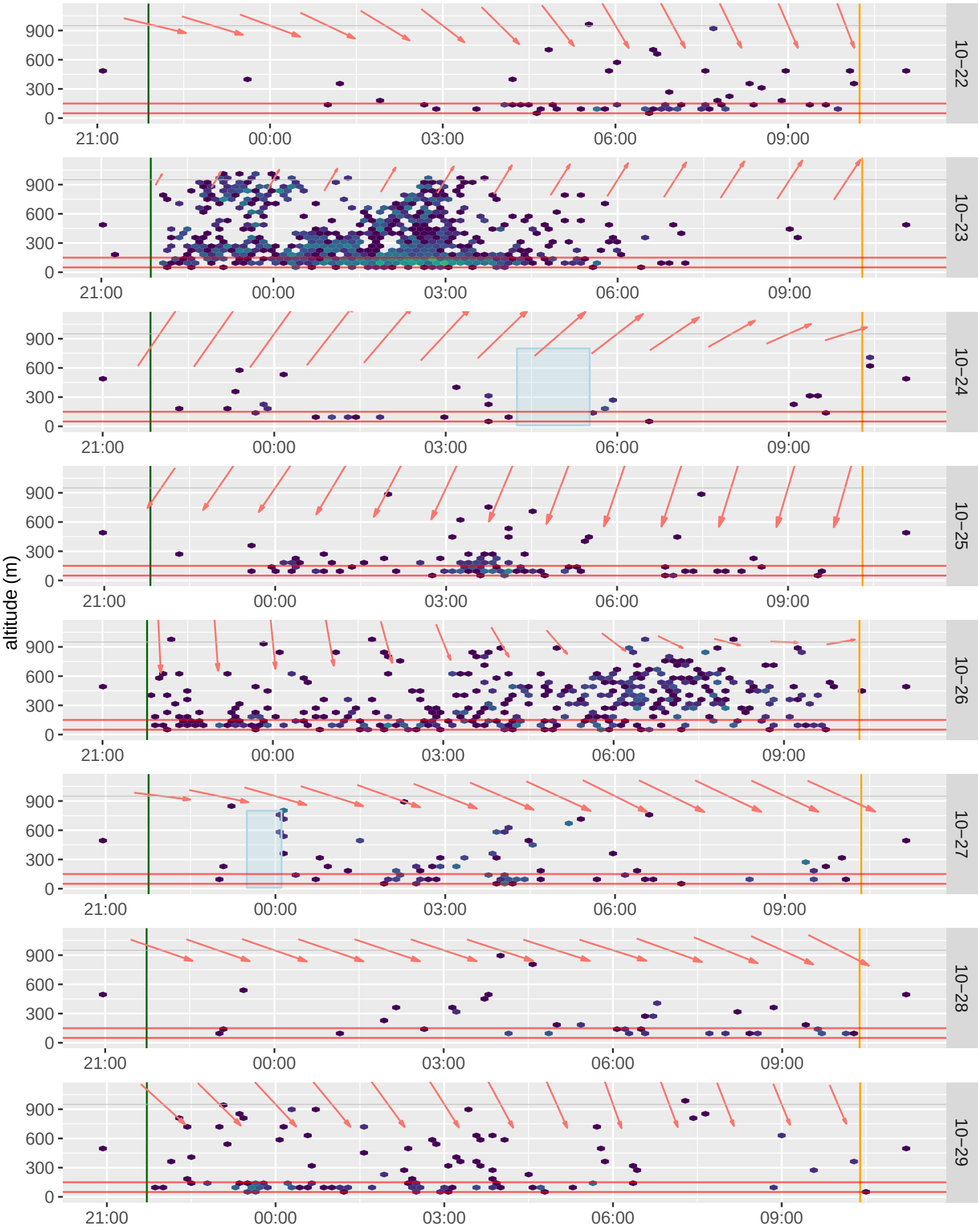

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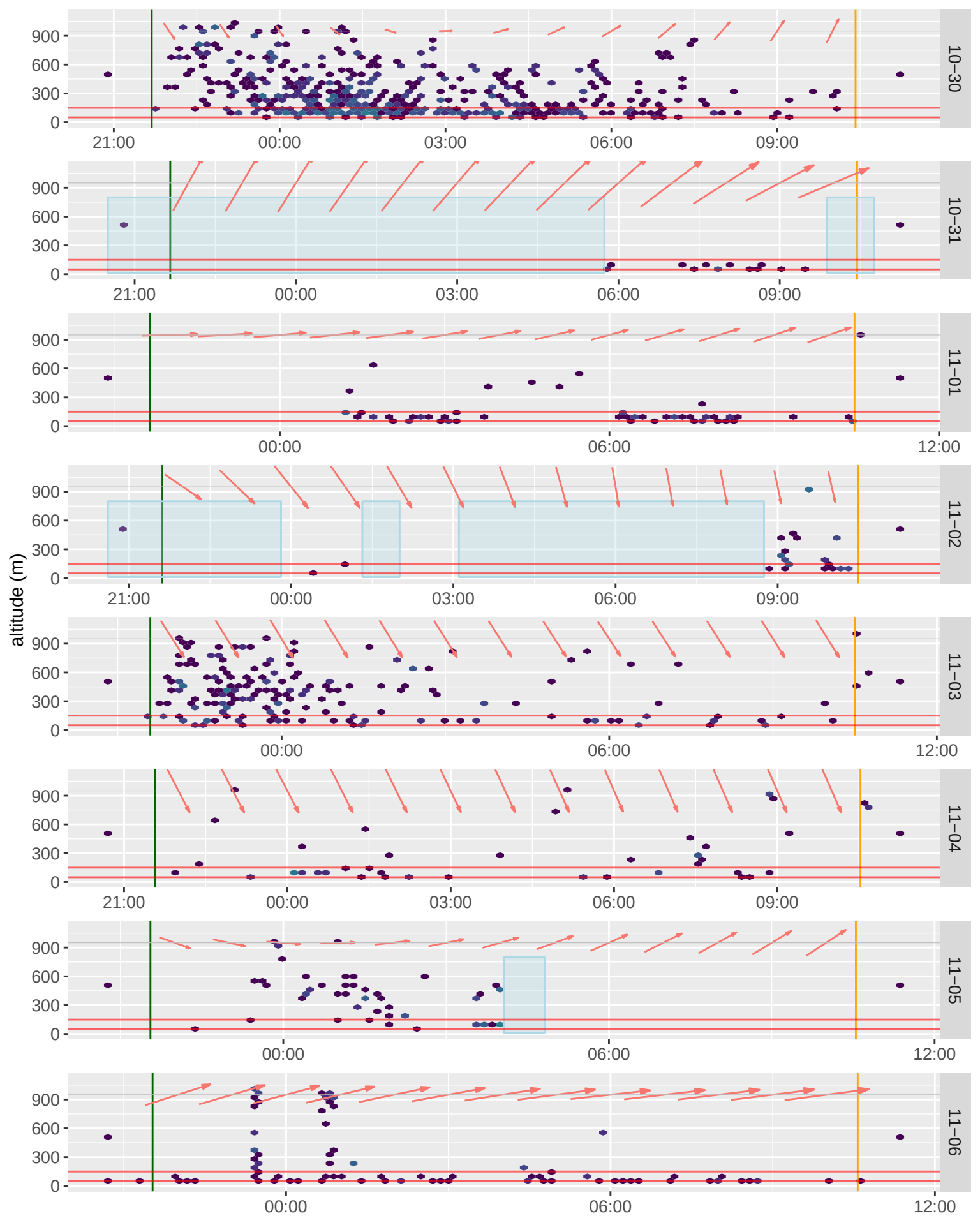

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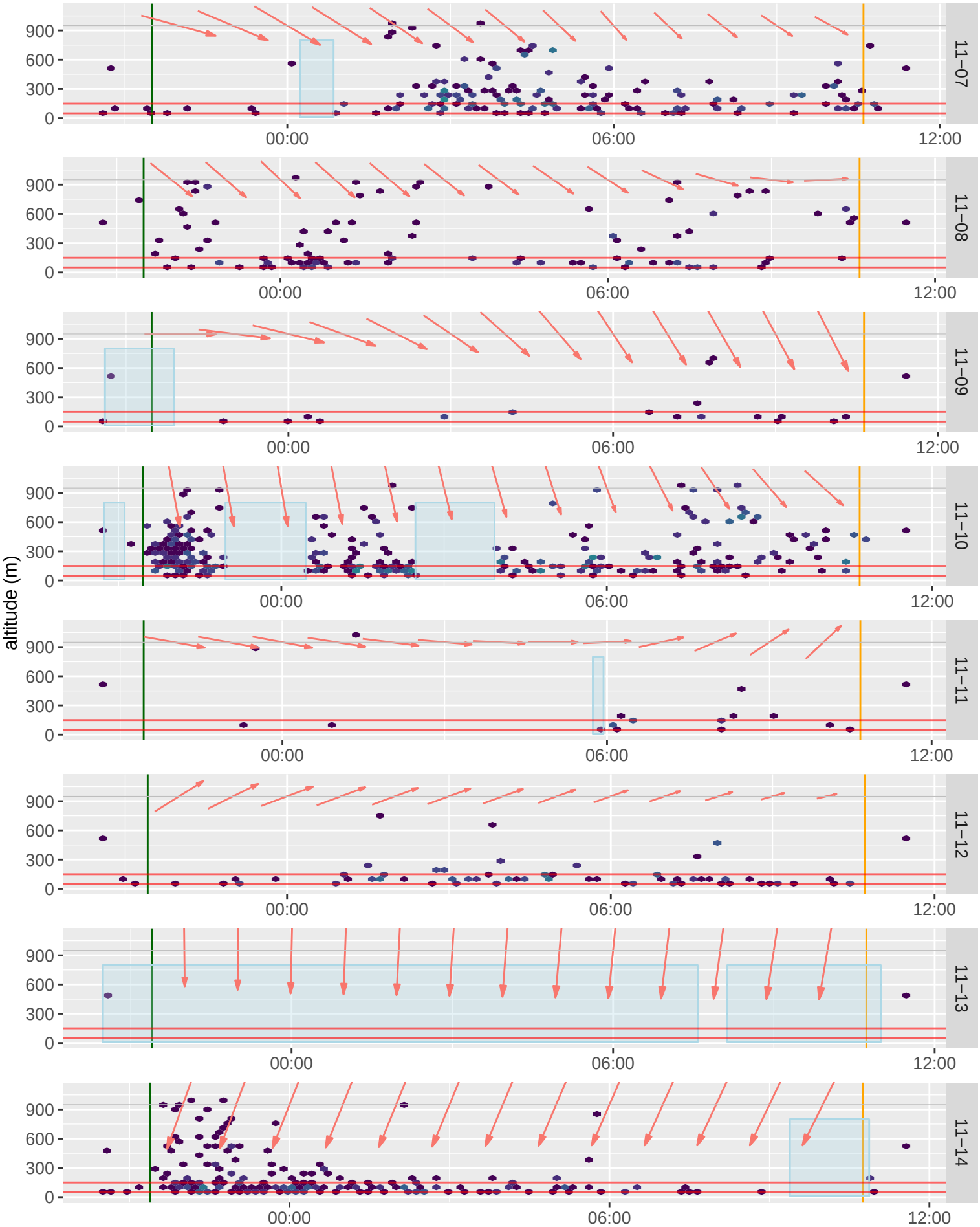

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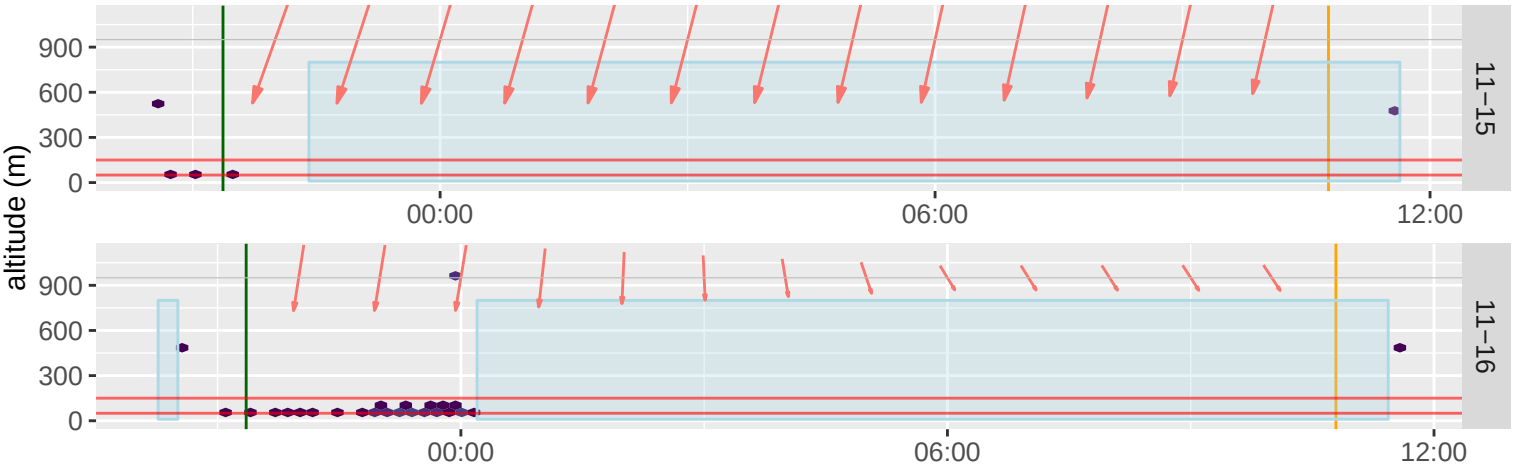

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10–20
10–21


altitude (m)
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900
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10–28
10–29


altitude (m)
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300
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21:00
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10–31
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11–03
11–04
11–05
11–06


altitude (m)
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11–11
11–12
11–13
11–14


altitude (m)
900
600
300
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00:00
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12:00
11–15
11–16

Appendix I - Table 1: eBird Summary

SCIENTIFIC NAME	CommonName	NS ESA	SARA	COSEWIC	AC CDC	# of Records
Phasianus colchicus	Ring-necked Pheasant				SNA	1
Setophaga aestiva	Northern Yellow Warbler				S5B	1
Sayornis phoebe	Eastern Phoebe				S5B	1
Falco columbarius	Merlin			NAR	S4S5B	1
Circus hudsonius	Northern Harrier			NAR	S3B,S4M	2
Cathartes aura	Turkey Vulture				S4B	3
Colaptes auratus	Northern Flicker				S5B	2
Tachycineta bicolor	Tree Swallow				S4S5B	1
Melospiza georgiana	Swamp Sparrow				S5B	1
Melospiza melodia	Song Sparrow				S5B	1
Euphagus carolinus	Rusty Blackbird	Endangered	SC	SC	S2S3B	1
Agelaius phoeniceus	Red-winged Blackbird				S4S5B,SUN	2
Vireo olivaceus	Red-eyed Vireo				S5B	1
Haemorhous purpureu	Purple Finch				S5B,S4N	1
Setophaga americana	Northern Parula				S5B	1
Empidonax alnorum	Alder Flycatcher				S5B	1
Sturnus vulgaris	European Starling				SNA	1
Junco hyemalis	Dark-eyed Junco				S5	1
Quiscalus quiscula	Common Grackle				S5B,SUN	1
Setophaga pensylvanic	Chestnut-sided Warbler				S5B	1
Bombycilla cedrorum	Cedar Waxwing				S5B	1
Setophaga virens	Black-throated Green Warbler				S4B	1
Hirundo rustica	Barn Swallow	Endangered	T	SC	S3B	2
Turdus migratorius	American Robin				S5B,S5N	1
Setophaga ruticilla	American Redstart				S5B	1
Spinus tristis	American Goldfinch				S5	1
Corvus brachyrhynchos	American Crow				S5	1
Empidonax minimus	Least Flycatcher				S5B	1
Setophaga coronata	Yellow-rumped Warbler				S5B	1

Appendix I - Table 2: MBBA Summary

Family Name	Science Name	Common Name	COSEWIC	SARA	NSESA	SRank	20LR83	20LR93
Tyrannidae	*Empidonax alnorum*	Alder Flycatcher				S5B	Possible	Confirmed
Ardeidae	*Botaurus lentiginosus*	American Bittern				S3B,S4M		Probable
Anatidae	*Anas rubripes*	American Black Duck				S5B,S5N	Possible	Confirmed
Corvidae	*Corvus brachyrhyncho*	American Crow				S5	Confirmed	Confirmed
Fringillidae	*Spinus tristis*	American Goldfinch				S5	Confirmed	Confirmed
Falconidae	*Falco sparverius*	American Kestrel				S3B,S4M	Confirmed	Probable
Parulidae	*Setophaga ruticilla*	American Redstart				S5B	Confirmed	Confirmed
Turdidae	*Turdus migratorius*	American Robin				S5B,S5N	Confirmed	Confirmed
Anatidae	*Mareca americana*	American Wigeon				S4B		Confirmed
Scolopacidae	*Scolopax minor*	American Woodcock				S4B	Possible	Possible
Accipitridae	*Haliaeetus leucocepha*	Bald Eagle	NAR			S5?		Confirmed
Hirundinidae	*Riparia riparia*	Bank Swallow	T	T	Endangered	S3B		Confirmed
Hirundinidae	*Hirundo rustica*	Barn Swallow	SC	SC	Endangered	S3B	Confirmed	Confirmed
Parulidae	*Setophaga castanea*	Bay-breasted Warbler				S4B	Possible	Possible
Alcedinidae	*Megaceryle alcyon*	Belted Kingfisher				S4B,SUN	Possible	Confirmed
Parulidae	*Mniotilta varia*	Black-and-white Warbler				S5B	Probable	Confirmed
Paridae	*Poecile atricapillus*	Black-capped Chickadee				S5	Probable	Confirmed
Parulidae	*Setophaga caerulescen*	Black-throated Blue Warbler				S4B	Possible	
Parulidae	*Setophaga virens*	Black-throated Green Warbler				S4B	Confirmed	Confirmed
Parulidae	*Setophaga fusca*	Blackburnian Warbler				S5B	Possible	Probable
Corvidae	*Cyanocitta cristata*	Blue Jay				S5	Probable	Confirmed
Vireonidae	*Vireo solitarius*	Blue-headed Vireo				S5B	Probable	Confirmed
Icteridae	*Dolichonyx oryzivorus*	Bobolink	SC	SC	Vulnerable	S2S3B		Possible
Paridae	*Poecile hudsonicus*	Boreal Chickadee				S3		Probable
Anatidae	*Branta canadensis*	Canada Goose				S5B,S5N		Confirmed
Parulidae	*Cardellina canadensis*	Canada Warbler	SC	SC	Endangered	S2S3B		Confirmed
Parulidae	*Setophaga tigrina*	Cape May Warbler				S3S4B,S4M	Possible	Possible
Bombycillidae	*Bombycilla cedrorum*	Cedar Waxwing				S5B	Possible	Confirmed
Parulidae	*Setophaga pensylvanic*	Chestnut-sided Warbler				S5B	Confirmed	Confirmed
Emberizidae	*Spizella passerina*	Chipping Sparrow				S4B	Possible	Confirmed
Hirundinidae	*Petrochelidon pyrrhon*	Cliff Swallow				S3S4B		Confirmed
Icteridae	*Quiscalus quiscula*	Common Grackle				S5B,SUN	Confirmed	Confirmed
Gaviidae	*Gavia immer*	Common Loon	NAR			S4B,S4N		Confirmed
Anatidae	*Mergus merganser*	Common Merganser				S5B,S4N		Possible
Caprimulgidae	*Chordeiles minor*	Common Nighthawk	SC	SC	Threatened	S3S4B		Possible
Corvidae	*Corvus corax*	Common Raven				S4	Confirmed	Confirmed
Parulidae	*Geothlypis trichas*	Common Yellowthroat				S5B	Confirmed	Confirmed
Emberizidae	*Junco hyemalis*	Dark-eyed Junco				S5	Confirmed	Confirmed
Picidae	*Dryobates pubescens*	Downy Woodpecker				S5	Probable	Probable
Turdidae	*Sialia sialis*	Eastern Bluebird	NAR			S4B		Probable
Tyrannidae	*Tyrannus tyrannus*	Eastern Kingbird				S3?B		Probable
Tyrannidae	*Contopus virens*	Eastern Wood-Pewee	SC	SC	Vulnerable	S3S4B	Possible	Possible
Sturnidae	*Sturnus vulgaris*	European Starling				SNA	Confirmed	Confirmed
Regulidae	*Regulus satrapa*	Golden-crowned Kinglet				S5	Confirmed	Possible
Mimidae	*Dumetella carolinensis*	Gray Catbird						Probable
Corvidae	*Perisoreus canadensis*	Gray Jay					Confirmed	Possible
Ardeidae	*Ardea herodias*	Great Blue Heron				S4B		Possible
Picidae	*Dryobates villosus*	Hairy Woodpecker				S5	Possible	Probable
Turdidae	*Catharus guttatus*	Hermit Thrush				S5B	Probable	Confirmed
Cardinalidae	*Passerina cyanea*	Indigo Bunting				S1B,SUM		Probable
Charadriidae	*Charadrius vociferus*	Killdeer				S3B	Possible	
Tyrannidae	*Empidonax minimus*	Least Flycatcher				S5B	Probable	Confirmed
Emberizidae	*Melospiza lincolnii*	Lincoln's Sparrow				S4B	Possible	

Appendix I - Table 2: MBBA Summary

Family Name	Science Name	Common Name	COSEWIC	SARA	NSESA	SRank	20LR83	20LR93
Parulidae	*Setophaga magnolia*	Magnolia Warbler				S4S5B	Confirmed	Confirmed
Falconidae	*Falco columbarius*	Merlin	NAR			S4S5B		Possible
Columbidae	*Zenaida macroura*	Mourning Dove				S5	Probable	Probable
Parulidae	*Geothlypis philadelphia*	Mourning Warbler				S4B	Confirmed	Possible
Parulidae	*Leiothlypis ruficapilla*	Nashville Warbler				S4B,S5M	Confirmed	Probable
Picidae	*Colaptes auratus*	Northern Flicker				S5B	Probable	Confirmed
Accipitridae	*Circus hudsonius*	Northern Harrier	NAR			S3B,S4M	Probable	Possible
Parulidae	*Setophaga americana*	Northern Parula				S5B	Confirmed	Confirmed
Accipitridae	*Pandion haliaetus*	Osprey				S4B		Possible
Parulidae	*Seiurus aurocapilla*	Ovenbird				S5B	Probable	Confirmed
Parulidae	*Setophaga palmarum*	Palm Warbler				S5B	Probable	Possible
Podicipedidae	*Podilymbus podiceps*	Pied-billed Grebe				S3S4B		Confirmed
Fringillidae	*Spinus pinus*	Pine Siskin				S4	Possible	
Fringillidae	*Haemorhous purpureu*	Purple Finch				S5B,S4N	Probable	Probable
Sittidae	*Sitta canadensis*	Red-breasted Nuthatch				S5	Probable	Probable
Vireonidae	*Vireo olivaceus*	Red-eyed Vireo				S5B	Probable	Confirmed
Accipitridae	*Buteo jamaicensis*	Red-tailed Hawk	NAR			S4	Probable	Possible
Icteridae	*Agelaius phoeniceus*	Red-winged Blackbird				S4S5B,SUN	Possible	Confirmed
Anatidae	*Aythya collaris*	Ring-necked Duck				S4B		Confirmed
Phasianidae	*Phasianus colchicus*	Ring-necked Pheasant				SNA		Confirmed
Columbidae	*Columba livia*	Rock Pigeon				SNA	Possible	Confirmed
Cardinalidae	*Pheucticus ludovicianu*	Rose-breasted Grosbeak				S3S4B	Probable	
Regulidae	*Corthylio calendula*	Ruby-crowned Kinglet				S4B,S5M	Possible	Probable
Trochilidae	*Archilochus colubris*	Ruby-throated Hummingbird				S5B	Probable	Probable
Phasianidae	*Bonasa umbellus*	Ruffed Grouse				S5	Possible	Confirmed
Icteridae	*Euphagus carolinus*	Rusty Blackbird	SC	SC	Endangered	S2S3B	Probable	
Emberizidae	*Passerculus sandwiche*	Savannah Sparrow				S4B,S5M	Confirmed	Confirmed
Accipitridae	*Accipiter striatus*	Sharp-shinned Hawk	NAR			S4	Possible	Possible
Emberizidae	*Melospiza melodia*	Song Sparrow				S5B	Confirmed	Confirmed
Scolopacidae	*Actitis macularius*	Spotted Sandpiper				S4B		Probable
Phasianidae	*Canachites canadensis*	Spruce Grouse				S4	Confirmed	
Turdidae	*Catharus ustulatus*	Swainson's Thrush				S4B,S5M	Confirmed	Probable
Emberizidae	*Melospiza georgiana*	Swamp Sparrow				S5B	Probable	Confirmed
Hirundinidae	*Tachycineta bicolor*	Tree Swallow				S4S5B	Probable	Probable
Turdidae	*Catharus fuscescens*	Veery				S4S5B	Possible	
Emberizidae	*Zonotrichia albicollis*	White-throated Sparrow				S4S5B,S5M	Confirmed	Confirmed
Fringillidae	*Loxia leucoptera*	White-winged Crossbill				S4S5	Confirmed	
Scolopacidae	*Gallinago delicata*	Wilson's Snipe				S3B,S4M		Probable
Troglodytidae	*Troglodytes hiemalis*	Winter Wren				S5B	Possible	Probable
Anatidae	*Aix sponsa*	Wood Duck				S5B	Possible	Possible
Parulidae	*Setophaga petechia*	Yellow Warbler				S5B	Confirmed	Confirmed
Tyrannidae	*Empidonax flaviventris*	Yellow-bellied Flycatcher				S4B,S5M	Possible	Possible
Picidae	*Sphyrapicus varius*	Yellow-bellied Sapsucker				S5B	Probable	
Parulidae	*Setophaga coronata*	Yellow-rumped Warbler				S5B	Confirmed	Confirmed

Appendix I - Table 3: Survey Locations

Survey Program	Survey Location	Date Surveyed	Weather	Temp (°C)	Wind (km)	Wind (Beaufort)
Breeding Birds	BB01HS	6/17/2024	Partial sun	9	0	0
Breeding Birds	BB01HS	7/9/2024	Partial sun	13	3	1
Breeding Birds	BB01HS	7/9/2025	Partial sun	13	3	1
Breeding Birds	BB01HS	6/17/2025	Partial sun	9	0	0
Breeding Birds	BB02HS	7/9/2024	Partial sun	13	3	1
Breeding Birds	BB02HS	6/17/2024	Partial sun	9	0	0
Breeding Birds	BB02HS	7/9/2025	Partial sun	13	3	1
Breeding Birds	BB02HS	6/17/2025	Partial sun	9	0	0
Breeding Birds	BB03HS	6/17/2024	Partial sun	9	0	0
Breeding Birds	BB03HS	7/9/2024	Partial sun	13	3	1
Breeding Birds	BB03HS	7/9/2025	Partial sun	13	3	1
Breeding Birds	BB03HS	6/17/2025	Partial sun	9	0	0
Breeding Birds	BB04HS	7/9/2024	Partial sun	13	3	1
Breeding Birds	BB04HS	6/17/2024	Partial sun	9	0	0
Breeding Birds	BB04HS	7/9/2025	Partial sun	13	3	1
Breeding Birds	BB04HS	6/17/2025	Partial sun	9	0	0
Breeding Birds	BB05HS	6/17/2024	Partial sun	9	0	0
Breeding Birds	BB05HS	7/9/2024	Partial sun	13	3	1
Breeding Birds	BB05HS	7/9/2025	Partial sun	13	3	1
Breeding Birds	BB05HS	6/17/2025	Partial sun	9	0	0
Breeding Birds	BB06HS	7/9/2024	Partial sun	13	3	1
Breeding Birds	BB06HS	7/9/2025	Partial sun	13	3	1
Breeding Birds	BB08HS	6/17/2024	Partial sun	9	0	0
Breeding Birds	BB08HS	7/9/2024	Partial sun	13	3	1
Breeding Birds	BB08HS	6/17/2025	Partial sun	9	0	0
Breeding Birds	BB08HS	7/9/2025	Partial sun	13	3	1
Breeding Birds	BB09HS	6/17/2024	Partial sun	9	0	0
Breeding Birds	BB09HS	7/9/2024	Partial sun	13	3	1
Breeding Birds	BB09HS	7/9/2025	Partial sun	13	3	1
Breeding Birds	BB09HS	6/17/2025	Partial sun	9	0	0
Breeding Birds	BB1	6/7/2024	Overcast	14	11	2
Breeding Birds	BB1	6/25/2024	Drizzle	15	5	1
Breeding Birds	BB1	6/7/2025	Overcast	14	11	2
Breeding Birds	BB1	6/25/2025	Drizzle	15	5	1
Breeding Birds	BB10	6/7/2024	Overcast	14	11	2
Breeding Birds	BB10	6/25/2024	Fog	15	10	2
Breeding Birds	BB10	6/7/2025	Overcast	14	11	2
Breeding Birds	BB10	6/25/2025	Fog	15	10	2
Breeding Birds	BB10HS	7/9/2024	Partial sun	13	3	1
Breeding Birds	BB10HS	6/17/2024	Sun	17	0	0
Breeding Birds	BB10HS	6/17/2025	Sun	17	0	0
Breeding Birds	BB10HS	7/9/2025	Partial sun	13	3	1
Breeding Birds	BB11	6/7/2024	Overcast	14	11	2
Breeding Birds	BB11	6/25/2024	Fog	15	10	2
Breeding Birds	BB11	6/7/2025	Overcast	14	11	2
Breeding Birds	BB11	6/25/2025	Fog	15	10	2
Breeding Birds	BB11HS	7/9/2024	Partial sun	13	3	1
Breeding Birds	BB11HS	6/17/2024	Partial sun	9	0	0
Breeding Birds	BB11HS	6/17/2025	Partial sun	9	0	0
Breeding Birds	BB11HS	7/9/2025	Partial sun	13	3	1
Breeding Birds	BB12	6/7/2024	Overcast	14	11	2

Appendix I - Table 3: Survey Locations

Survey Program	Survey Location	Date Surveyed	Weather	Temp (°C)	Wind (km)	Wind (Beaufort)
Breeding Birds	BB12	6/25/2024	Fog	15	10	2
Breeding Birds	BB12	6/7/2025	Overcast	14	11	2
Breeding Birds	BB12	6/25/2025	Fog	15	10	2
Breeding Birds	BB12HS	7/9/2024	Partial sun	13	3	1
Breeding Birds	BB12HS	7/9/2025	Partial sun	13	3	1
Breeding Birds	BB13	6/25/2024	Fog	15	10	2
Breeding Birds	BB13	6/7/2024	Overcast	14	11	2
Breeding Birds	BB13	6/25/2025	Fog	15	10	2
Breeding Birds	BB13	6/7/2025	Overcast	14	11	2
Breeding Birds	BB13HS	6/17/2024	Partial sun	9	0	0
Breeding Birds	BB13HS	7/9/2024	Partial sun	13	3	1
Breeding Birds	BB13HS	7/9/2025	Partial sun	13	3	1
Breeding Birds	BB13HS	6/17/2025	Partial sun	9	0	0
Breeding Birds	BB14	6/7/2024	Overcast	14	11	2
Breeding Birds	BB14	6/25/2024	Fog	15	10	2
Breeding Birds	BB14	6/25/2025	Fog	15	10	2
Breeding Birds	BB14	6/7/2025	Overcast	14	11	2
Breeding Birds	BB15	6/7/2024	Overcast	14	11	2
Breeding Birds	BB15	6/25/2024	Fog	15	10	2
Breeding Birds	BB15	6/7/2025	Overcast	14	11	2
Breeding Birds	BB15	6/25/2025	Fog	15	10	2
Breeding Birds	BB2	6/7/2024	Overcast	14	11	2
Breeding Birds	BB2	6/25/2024	Drizzle	15	5	1
Breeding Birds	BB2	6/7/2025	Overcast	14	11	2
Breeding Birds	BB2	6/25/2025	Drizzle	15	5	1
Breeding Birds	BB3	6/7/2024	Overcast	14	11	2
Breeding Birds	BB3	6/25/2024	Fog	15	5	1
Breeding Birds	BB3	6/25/2025	Fog	15	5	1
Breeding Birds	BB3	6/7/2025	Overcast	14	11	2
Breeding Birds	BB4	6/7/2024	Overcast	14	11	2
Breeding Birds	BB4	6/25/2024	Fog	15	5	1
Breeding Birds	BB4	6/7/2025	Overcast	14	11	2
Breeding Birds	BB4	6/25/2025	Fog	15	5	1
Breeding Birds	BB5	6/7/2024	Overcast	14	11	2
Breeding Birds	BB5	6/7/2025	Overcast	14	11	2
Breeding Birds	BB6	6/7/2024	Overcast	14	11	2
Breeding Birds	BB6	6/25/2024	Fog	15	5	1
Breeding Birds	BB6	6/25/2025	Fog	15	5	1
Breeding Birds	BB6	6/7/2025	Overcast	14	11	2
Breeding Birds	BB7	6/7/2024	Overcast	14	11	2
Breeding Birds	BB7	6/25/2024	Fog	15	10	2
Breeding Birds	BB7	6/25/2025	Fog	15	10	2
Breeding Birds	BB7	6/7/2025	Overcast	14	11	2
Breeding Birds	BB8	6/7/2024	Overcast	14	11	2
Breeding Birds	BB8	6/25/2024	Fog	15	10	2
Breeding Birds	BB8	6/25/2025	Fog	15	10	2
Breeding Birds	BB8	6/7/2025	Overcast	14	11	2
Breeding Birds	BB9	6/7/2024	Overcast	14	11	2
Breeding Birds	BB9	6/25/2024	Fog	15	10	2
Breeding Birds	BB9	6/7/2025	Overcast	14	11	2
Breeding Birds	BB9	6/25/2025	Fog	15	10	2

Appendix I - Table 3: Survey Locations

Survey Program	Survey Location	Date Surveyed	Weather	Temp (°C)	Wind (km)	Wind (Beaufort)
Fall Migration	FM01	9/12/2024	Clear	11	10	2
Fall Migration	FM01	8/27/2024	Fog	14	2	1
Fall Migration	FM01	10/24/2024	Partial sun	12	16	3
Fall Migration	FM01	11/8/2024	Partial sun	4	14	3
Fall Migration	FM02	8/15/2024	Clear	15	10	2
Fall Migration	FM02	9/12/2024	Clear	11	10	2
Fall Migration	FM02	8/27/2024	Fog	14	2	1
Fall Migration	FM02	10/24/2024	Partial sun	12	16	3
Fall Migration	FM02	11/8/2024	Partial sun	4	14	3
Fall Migration	FM03	9/12/2024	Clear	11	10	2
Fall Migration	FM03	8/27/2024	Fog	14	2	1
Fall Migration	FM03	10/24/2024	Partial sun	12	16	3
Fall Migration	FM03	11/8/2024	Partial sun	4	14	3
Fall Migration	FM04	8/15/2024	Clear	15	10	2
Fall Migration	FM04	9/12/2024	Clear	11	10	2
Fall Migration	FM04	8/27/2024	Fog	14	2	1
Fall Migration	FM04	10/24/2024	Partial sun	12	16	3
Fall Migration	FM04	11/8/2024	Overcast	6	14	3
Fall Migration	FM05	8/15/2024	Clear	15	10	2
Fall Migration	FM05	9/12/2024	Clear	11	10	2
Fall Migration	FM05	8/27/2024	Fog	14	2	1
Fall Migration	FM05	10/24/2024	Partial sun	12	16	3
Fall Migration	FM05	11/8/2024	Overcast	6	14	3
Fall Migration	FM06	8/15/2024	Clear	15	10	2
Fall Migration	FM06	8/27/2024	Fog	14	2	1
Fall Migration	FM06	10/24/2024	Partial sun	14	16	3
Fall Migration	FM06	11/8/2024	Overcast	8	14	3
Fall Migration	FM07	8/15/2024	Clear	15	10	2
Fall Migration	FM07	9/12/2024	Clear	11	10	2
Fall Migration	FM07	8/27/2024	Fog	14	2	1
Fall Migration	FM07	10/24/2024	Partial sun	12	16	3
Fall Migration	FM07	11/8/2024	Overcast	6	14	3
Fall Migration	FM08	9/12/2024	Clear	11	10	2
Fall Migration	FM08	8/27/2024	Fog	14	2	1
Fall Migration	FM08	10/24/2024	Partial sun	12	16	3
Fall Migration	FM08	11/8/2024	Overcast	6	14	3
Fall Migration	FM09	9/12/2024	Clear	11	10	2
Fall Migration	FM09	8/27/2024	Fog	14	2	1
Fall Migration	FM09	10/24/2024	Partial sun	12	16	3
Fall Migration	FM09	11/8/2024	Overcast	8	14	3
Fall Migration	FM10	9/12/2024	Clear	11	10	2
Fall Migration	FM10	8/27/2024	Fog	14	2	1
Fall Migration	FM10	10/24/2024	Partial sun	12	16	3
Fall Migration	FM10	11/8/2024	Overcast	6	14	3
Fall Migration	FM11	9/12/2024	Clear	11	10	2
Fall Migration	FM11	8/27/2024	Fog	14	2	1
Fall Migration	FM11	10/24/2024	Partial sun	12	16	3
Fall Migration	FM11	11/8/2024	Overcast	6	14	3
Fall Migration	FM11	11/8/2024	Overcast	8	14	3
Fall Migration	FM12	9/12/2024	Clear	11	10	2
Fall Migration	FM12	10/24/2024	Partial sun	12	16	3

Appendix I - Table 3: Survey Locations

Survey Program	Survey Location	Date Surveyed	Weather	Temp (°C)	Wind (km)	Wind (Beaufort)
Fall Migration	FM12	11/8/2024	Overcast	8	14	3
Fall Migration	/ between TC01 ar	8/12/2025	Sun	28	8	2
Fall Migration	cidental observati	10/15/2025	Partial sun	7	0	0
Fall Migration	TC01	8/12/2025	Sun	28	8	2
Fall Migration	TC02	8/12/2025	Sun	28	8	2
Fall Migration	TC02	8/12/2025	Sun	28	8	2
Fall Migration	TC02	8/12/2025	Sun	28	8	2
Fall Migration	TC03	8/12/2025	Sun	28	8	2
Fall Migration	TC03	8/12/2025	Sun	28	8	2
Fall Migration	WBFA T1	9/10/2025	Partial sun	15	0	0
Fall Migration	WBFA T1	9/20/2025	Clear	4	5	1
Fall Migration	WBFA T1	9/30/2025	Partial sun	15	15	3
Fall Migration	WBFA T1	10/15/2025	Partial sun	7	0	0
Fall Migration	WBFA T1	10/25/2025	Partial sun	8	5	1
Fall Migration	WBFA T10	9/10/2025	Partial sun	15	0	0
Fall Migration	WBFA T10	9/20/2025	Clear	10	30	5
Fall Migration	WBFA T10	10/1/2025	Partial sun	2	5	1
Fall Migration	WBFA T10	10/15/2025	Partial sun	7	0	0
Fall Migration	WBFA T10	10/25/2025	Partial sun	8	5	1
Fall Migration	WBFA T11	9/15/2025	Fog	10	0	0
Fall Migration	WBFA T11	9/24/2025	Overcast	20	20	4
Fall Migration	WBFA T11	9/30/2025	Clear	15	10	2
Fall Migration	WBFA T11	10/14/2025	Partial sun	3	5	1
Fall Migration	WBFA T11	10/22/2025	Overcast	10	10	2
Fall Migration	WBFA T12	9/15/2025	Fog	10	0	0
Fall Migration	WBFA T12	9/24/2025	Overcast	20	20	4
Fall Migration	WBFA T12	9/30/2025	Clear	15	10	2
Fall Migration	WBFA T12	10/14/2025	Partial sun	3	5	1
Fall Migration	WBFA T12	10/22/2025	Overcast	10	10	2
Fall Migration	WBFA T13	9/15/2025	Fog	10	0	0
Fall Migration	WBFA T13	9/24/2025	Overcast	20	20	4
Fall Migration	WBFA T13	9/30/2025	Clear	15	10	2
Fall Migration	WBFA T13	10/14/2025	Partial sun	3	5	1
Fall Migration	WBFA T13	10/22/2025	Overcast	10	10	2
Fall Migration	WBFA T14	9/15/2025	Fog	10	0	0
Fall Migration	WBFA T14	9/24/2025	Overcast	20	20	4
Fall Migration	WBFA T14	9/30/2025	Clear	15	10	2
Fall Migration	WBFA T14	10/14/2025	Partial sun	3	5	1
Fall Migration	WBFA T14	10/22/2025	Overcast	10	10	2
Fall Migration	WBFA T15	9/15/2025	Fog	10	0	0
Fall Migration	WBFA T15	9/24/2025	Overcast	20	20	4
Fall Migration	WBFA T15	10/1/2025	Overcast	10	17.5	3
Fall Migration	WBFA T15	10/14/2025	Partial sun	3	5	1
Fall Migration	WBFA T15	10/22/2025	Overcast	10	10	2
Fall Migration	WBFA T16	9/15/2025	Fog	10	0	0
Fall Migration	WBFA T16	9/24/2025	Partial sun	13	10	2
Fall Migration	WBFA T16	10/1/2025	Partial sun	2	5	1
Fall Migration	WBFA T16	10/14/2025	Partial sun	3	5	1
Fall Migration	WBFA T16	10/22/2025	Partial sun	5	0	0
Fall Migration	WBFA T18	9/15/2025	Partial sun	5	20	4
Fall Migration	WBFA T18	9/24/2025	Partial sun	13	10	2

Appendix I - Table 3: Survey Locations

Survey Program	Survey Location	Date Surveyed	Weather	Temp (°C)	Wind (km)	Wind (Beaufort)
Fall Migration	WBFA T18	10/1/2025	Partial sun	2	5	1
Fall Migration	WBFA T18	10/14/2025	Partial sun	3	5	1
Fall Migration	WBFA T18	10/22/2025	Partial sun	5	0	0
Fall Migration	WBFA T19	9/15/2025	Partial sun	5	20	4
Fall Migration	WBFA T19	9/24/2025	Overcast	20	20	4
Fall Migration	WBFA T19	10/1/2025	Partial sun	2	5	1
Fall Migration	WBFA T19	10/14/2025	Partial sun	3	5	1
Fall Migration	WBFA T19	10/22/2025	Partial sun	5	0	0
Fall Migration	WBFA T2	9/10/2025	Partial sun	15	0	0
Fall Migration	WBFA T2	9/20/2025	Clear	4	5	1
Fall Migration	WBFA T2	9/30/2025	Partial sun	15	15	3
Fall Migration	WBFA T2	10/15/2025	Partial sun	7	0	0
Fall Migration	WBFA T2	10/25/2025	Partial sun	8	5	1
Fall Migration	WBFA T20	9/15/2025	Partial sun	5	20	4
Fall Migration	WBFA T20	9/24/2025	Overcast	20	20	4
Fall Migration	WBFA T20	10/1/2025	Overcast	10	17.5	3
Fall Migration	WBFA T20	10/14/2025	Partial sun	3	5	1
Fall Migration	WBFA T20	10/22/2025	Overcast	10	10	2
Fall Migration	WBFA T3	9/10/2025	Partial sun	15	0	0
Fall Migration	WBFA T3	9/20/2025	Clear	4	5	1
Fall Migration	WBFA T3	9/30/2025	Partial sun	15	15	3
Fall Migration	WBFA T3	10/15/2025	Partial sun	7	0	0
Fall Migration	WBFA T3	10/25/2025	Partial sun	8	5	1
Fall Migration	WBFA T4	9/10/2025	Partial sun	15	0	0
Fall Migration	WBFA T4	9/20/2025	Clear	4	5	1
Fall Migration	WBFA T4	9/30/2025	Clear	15	10	2
Fall Migration	WBFA T4	10/15/2025	Partial sun	7	0	0
Fall Migration	WBFA T4	10/25/2025	Partial sun	8	5	1
Fall Migration	WBFA T5	9/10/2025	Partial sun	15	0	0
Fall Migration	WBFA T5	9/20/2025	Clear	10	20	4
Fall Migration	WBFA T5	9/30/2025	Clear	15	10	2
Fall Migration	WBFA T5	10/15/2025	Partial sun	7	0	0
Fall Migration	WBFA T5	10/25/2025	Partial sun	8	5	1
Fall Migration	WBFA T6	9/10/2025	Partial sun	15	0	0
Fall Migration	WBFA T6	9/20/2025	Clear	10	20	4
Fall Migration	WBFA T6	9/30/2025	Clear	15	10	2
Fall Migration	WBFA T6	10/15/2025	Partial sun	7	0	0
Fall Migration	WBFA T6	10/25/2025	Partial sun	8	5	1
Fall Migration	WBFA T7	9/10/2025	Partial sun	15	0	0
Fall Migration	WBFA T7	9/20/2025	Clear	10	20	4
Fall Migration	WBFA T7	9/30/2025	Clear	15	10	2
Fall Migration	WBFA T7	10/15/2025	Partial sun	7	0	0
Fall Migration	WBFA T7	10/25/2025	Partial sun	8	5	1
Fall Migration	WBFA T8	9/10/2025	Partial sun	15	0	0
Fall Migration	WBFA T8	9/20/2025	Clear	10	30	5
Fall Migration	WBFA T8	10/1/2025	Partial sun	2	5	1
Fall Migration	WBFA T8	10/14/2025	Partial sun	3	5	1
Fall Migration	WBFA T8	10/22/2025	Overcast	10	10	2
Fall Migration	WBFA T9	9/10/2025	Partial sun	15	0	0
Fall Migration	WBFA T9	9/20/2025	Clear	10	30	5
Fall Migration	WBFA T9	10/1/2025	Partial sun	2	5	1

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Survey Program	Survey Location	Date Surveyed	Weather	Temp (°C)	Wind (km)	Wind (Beaufort)
Fall Migration	WBFA T9	10/15/2025	Partial sun	7	0	0
Fall Migration	WBFA T9	10/25/2025	Partial sun	8	5	1
Nightjar	NJ01HS	6/16/2025	Overcast	14	8	2
Nightjar	NJ01HS	7/8/2025	Overcast	18	10	2
Nightjar	NJ01HS	7/8/2025	Overcast	18	10	2
Nightjar	NJ06HS	6/16/2025	Overcast	14	8	2
Nightjar	NJ06HS	7/8/2025	Overcast	18	10	2
Nightjar	SL03	6/21/2024	Overcast	16	10	2
Nightjar	SL03	6/24/2024	Overcast	14	13	3
Nightjar	SL06	6/21/2024	Overcast	16	10	2
Nightjar	SL06	6/24/2024	Overcast	14	13	3
Owls	SL1	4/15/2025	Overcast	6	25	4
Owls	SL2	4/15/2025	Overcast	5	26	4
Owls	SL3	4/15/2025	Overcast	5	26	4
Owls	SL4	4/15/2025	Rain	5	26	4
Owls	SL5	4/15/2025	Drizzle	6	25	4
Owls	SL6	4/15/2025	Overcast	6	25	4
Owls	SL7	4/15/2025	Overcast	6	25	4
Owls	SL8	4/15/2025	Overcast	6	25	4
Owls	SL9	4/15/2025	Drizzle	6	25	4

Appendix I - Table 3: Survey Locations

Survey Program	Survey Location	Date Surveyed	Weather	Temp (°C)	Wind (km)	Wind (Beaufort)
Spring Migration	S01	4/16/2025	Partial sun	3	31	5
Spring Migration	S01	5/14/2025	Overcast	7	8	2
Spring Migration	S01	5/27/2025	Sun	12	3	1
Spring Migration	S02	4/16/2025	Partial sun	3	31	5
Spring Migration	S02	5/14/2025	Overcast	7	8	2
Spring Migration	S02	5/27/2025	Sun	12	3	1
Spring Migration	S03	4/16/2025	Partial sun	3	31	5
Spring Migration	S03	5/27/2025	Sun	12	3	1
Spring Migration	S04	4/16/2025	Partial sun	3	31	5
Spring Migration	S04	5/13/2025	Sun	8	20	4
Spring Migration	S04	5/14/2025	Overcast	7	8	2
Spring Migration	S04	5/27/2025	Sun	12	3	1
Spring Migration	S05	4/16/2025	Partial sun	3	31	5
Spring Migration	S05	5/14/2025	Overcast	7	8	2
Spring Migration	S05	5/27/2025	Sun	12	3	1
Spring Migration	S06	4/16/2025	Partial sun	3	31	5
Spring Migration	S06	5/14/2025	Overcast	7	8	2
Spring Migration	S06	5/27/2025	Sun	12	3	1
Spring Migration	S08	4/16/2025	Partial sun	3	31	5
Spring Migration	S08	5/14/2025	Overcast	7	8	2
Spring Migration	S08	5/28/2025	Sun	11	3	3
Spring Migration	S08	5/28/2025	Sun	11	15	3
Spring Migration	S09	4/16/2025	Partial sun	3	31	5
Spring Migration	S09	5/13/2025	Sun	8	20	4
Spring Migration	S09	5/27/2025	Sun	12	3	1
Spring Migration	S10	4/16/2025	Partial sun	3	31	5
Spring Migration	S10	5/13/2025	Sun	8	20	4
Spring Migration	S10	5/27/2025	Sun	12	3	1
Spring Migration	S11	4/16/2025	Partial sun	3	31	5
Spring Migration	S11	5/13/2025	Sun	8	20	4
Spring Migration	S11	5/27/2025	Sun	12	3	1
Spring Migration	WB sp 1	4/2/2025	Partial sun	-3	7.5	2
Spring Migration	WB sp 1	4/20/2026	Overcast	6	12.5	3
Spring Migration	WB sp 1	4/29/2026	Overcast	3	5	1
Spring Migration	WB sp 1	5/8/2026	Clear	5	0	0
Spring Migration	WB sp 1	5/18/2026	Partial sun	13	10	2
Spring Migration	WB sp 1	5/24/2026	Clear	5	20	4
Spring Migration	WB sp 10	4/2/2025	Partial sun	-2	15	3
Spring Migration	WB sp 10	4/20/2026	Overcast	6	12.5	3
Spring Migration	WB sp 10	4/29/2026	Drizzle	4	10	2
Spring Migration	WB sp 10	5/9/2026	Partial sun	5	0	0
Spring Migration	WB sp 10	5/18/2026	Clear	8	10	2
Spring Migration	WB sp 10	5/31/2026	Overcast	5	12.5	3
Spring Migration	WB sp 11	4/2/2025	Partial sun	-2	15	3
Spring Migration	WB sp 11	4/20/2026	Overcast	6	12.5	3
Spring Migration	WB sp 11	4/29/2026	Rain	5	5	1
Spring Migration	WB sp 11	5/9/2026	Partial sun	5	0	0
Spring Migration	WB sp 11	5/18/2026	Clear	8	10	2
Spring Migration	WB sp 11	5/31/2026	Overcast	5	12.5	3
Spring Migration	WB sp 12	4/2/2025	Partial sun	-2	15	3
Spring Migration	WB sp 12	4/20/2026	Overcast	6	12.5	3

Appendix I - Table 3: Survey Locations

Survey Program	Survey Location	Date Surveyed	Weather	Temp (°C)	Wind (km)	Wind (Beaufort)
Spring Migration	WB sp 12	4/29/2026	Drizzle	4	5	1
Spring Migration	WB sp 12	5/9/2026	Partial sun	5	0	0
Spring Migration	WB sp 12	5/18/2026	Clear	8	10	2
Spring Migration	WB sp 12	5/31/2026	Overcast	5	12.5	3
Spring Migration	WB sp 13	4/2/2025	Partial sun	-2	15	3
Spring Migration	WB sp 13	4/20/2026	Overcast	6	12.5	3
Spring Migration	WB sp 13	4/29/2026	Drizzle	4	5	1
Spring Migration	WB sp 13	5/9/2026	Partial sun	18	12.5	3
Spring Migration	WB sp 13	5/18/2026	Clear	8	10	2
Spring Migration	WB sp 13	5/31/2026	Overcast	5	12.5	3
Spring Migration	WB sp 14	4/2/2025	Partial sun	-2	15	3
Spring Migration	WB sp 14	4/20/2026	Overcast	6	12.5	3
Spring Migration	WB sp 14	4/29/2026	Rain	5	5	1
Spring Migration	WB sp 14	5/18/2026	Clear	8	10	2
Spring Migration	WB sp 14	5/31/2026	Overcast	5	12.5	3
Spring Migration	WB sp 15	4/2/2025	Partial sun	-2	15	3
Spring Migration	WB sp 15	4/20/2026	Overcast	6	12.5	3
Spring Migration	WB sp 15	4/29/2026	Rain	5	5	1
Spring Migration	WB sp 15	5/9/2026	Partial sun	5	0	0
Spring Migration	WB sp 15	5/18/2026	Clear	8	10	2
Spring Migration	WB sp 15	5/31/2026	Overcast	5	12.5	3
Spring Migration	WB sp 16	4/26/2026	Clear	6	5	1
Spring Migration	WB sp 16	5/8/2026	Clear	5	0	0
Spring Migration	WB sp 16	5/18/2026	Clear	4	15	3
Spring Migration	WB sp 16	5/24/2026	Clear	5	20	4
Spring Migration	WB sp 17	4/26/2026	Clear	6	5	1
Spring Migration	WB sp 17	5/8/2026	Clear	2	0	0
Spring Migration	WB sp 17	5/18/2026	Clear	10	15	3
Spring Migration	WB sp 17	5/24/2026	Clear	0	10	2
Spring Migration	WB sp 18	4/18/2026	Fog	1	5	1
Spring Migration	WB sp 18	4/26/2026	Clear	6	5	1
Spring Migration	WB sp 18	5/8/2026	Clear	2	0	0
Spring Migration	WB sp 18	5/18/2026	Clear	4	15	3
Spring Migration	WB sp 18	5/24/2026	Clear	0	10	2
Spring Migration	WB sp 19	4/18/2026	Fog	1	5	1
Spring Migration	WB sp 19	4/26/2026	Clear	6	5	1
Spring Migration	WB sp 19	5/8/2026	Clear	5	0	0
Spring Migration	WB sp 19	5/18/2026	Clear	5	15	3
Spring Migration	WB sp 19	5/24/2026	Clear	0	10	2
Spring Migration	WB sp 2	4/2/2025	Partial sun	-3	7.5	2
Spring Migration	WB sp 2	4/20/2026	Overcast	6	12.5	3
Spring Migration	WB sp 2	4/29/2026	Drizzle	3	5	1
Spring Migration	WB sp 2	5/8/2026	Clear	5	0	0
Spring Migration	WB sp 2	5/18/2026	Partial sun	11	15	3
Spring Migration	WB sp 2	5/24/2026	Clear	5	20	4
Spring Migration	WB sp 20	4/18/2026	Fog	1	5	1
Spring Migration	WB sp 20	4/26/2026	Clear	10	17.5	3
Spring Migration	WB sp 20	5/8/2026	Clear	5	0	0
Spring Migration	WB sp 20	5/18/2026	Clear	7	15	3
Spring Migration	WB sp 20	5/24/2026	Clear	0	10	2
Spring Migration	WB sp 21	4/18/2026	Fog	1	5	1

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Survey Program	Survey Location	Date Surveyed	Weather	Temp (°C)	Wind (km)	Wind (Beaufort)
Spring Migration	WB sp 21	4/26/2026	Clear	10	17.5	3
Spring Migration	WB sp 21	5/8/2026	Clear	5	0	0
Spring Migration	WB sp 21	5/18/2026	Clear	5	0	0
Spring Migration	WB sp 21	5/24/2026	Clear	5	20	4
Spring Migration	WB sp 22	4/18/2026	Fog	1	5	1
Spring Migration	WB sp 22	4/26/2026	Clear	10	17.5	3
Spring Migration	WB sp 22	5/8/2026	Clear	5	0	0
Spring Migration	WB sp 22	5/18/2026	Clear	8	10	2
Spring Migration	WB sp 22	5/24/2026	Clear	5	20	4
Spring Migration	WB sp 23	4/18/2026	Fog	1	5	1
Spring Migration	WB sp 23	4/26/2026	Clear	10	17.5	3
Spring Migration	WB sp 23	5/8/2026	Clear	5	0	0
Spring Migration	WB sp 23	5/18/2026	Clear	5	0	0
Spring Migration	WB sp 23	5/24/2026	Clear	5	20	4
Spring Migration	WB sp 24	4/18/2026	Fog	1	5	1
Spring Migration	WB sp 24	4/26/2026	Clear	10	17.5	3
Spring Migration	WB sp 24	5/8/2026	Clear	5	0	0
Spring Migration	WB sp 24	5/18/2026	Clear	8	10	2
Spring Migration	WB sp 24	5/24/2026	Clear	5	20	4
Spring Migration	WB sp 25	4/18/2026	Fog	1	5	1
Spring Migration	WB sp 25	4/26/2026	Clear	10	17.5	3
Spring Migration	WB sp 25	5/8/2026	Clear	5	0	0
Spring Migration	WB sp 25	5/18/2026	Clear	8	10	2
Spring Migration	WB sp 25	5/24/2026	Clear	5	20	4
Spring Migration	WB sp 26	4/18/2026	Fog	1	5	1
Spring Migration	WB sp 26	4/29/2026	Drizzle	4	5	1
Spring Migration	WB sp 26	4/29/2026	Rain	5	5	1
Spring Migration	WB sp 26	5/9/2026	Partial sun	5	0	0
Spring Migration	WB sp 26	5/18/2026	Clear	8	10	2
Spring Migration	WB sp 26	5/31/2026	Overcast	5	12.5	3
Spring Migration	WB sp 27	4/18/2026	Fog	1	5	1
Spring Migration	WB sp 27	4/29/2026	Rain	5	5	1
Spring Migration	WB sp 27	5/9/2026	Partial sun	5	0	0
Spring Migration	WB sp 27	5/18/2026	Clear	8	10	2
Spring Migration	WB sp 27	5/31/2026	Overcast	5	12.5	3
Spring Migration	WB sp 28	4/18/2026	Clear	10	10	2
Spring Migration	WB sp 28	4/29/2026	Rain	5	5	1
Spring Migration	WB sp 28	5/9/2026	Partial sun	5	0	0
Spring Migration	WB sp 28	5/18/2026	Clear	8	10	2
Spring Migration	WB sp 28	5/31/2026	Overcast	3	10	2
Spring Migration	WB sp 29	4/18/2026	Clear	10	10	2
Spring Migration	WB sp 29	4/29/2026	Rain	5	5	1
Spring Migration	WB sp 29	5/9/2026	Partial sun	5	0	0
Spring Migration	WB sp 29	5/18/2026	Clear	8	10	2
Spring Migration	WB sp 29	5/31/2026	Overcast	3	10	2
Spring Migration	WB sp 3	4/2/2025	Partial sun	-3	7.5	2
Spring Migration	WB sp 3	4/20/2026	Overcast	6	12.5	3
Spring Migration	WB sp 3	4/29/2026	Drizzle	4	5	1
Spring Migration	WB sp 3	5/9/2026	Partial sun	5	0	0
Spring Migration	WB sp 3	5/18/2026	Partial sun	14	10	2
Spring Migration	WB sp 3	5/24/2026	Clear	5	20	4

Appendix I - Table 3: Survey Locations

Survey Program	Survey Location	Date Surveyed	Weather	Temp (°C)	Wind (km)	Wind (Beaufort)
Spring Migration	WB sp 30	4/18/2026	Clear	10	10	2
Spring Migration	WB sp 30	4/29/2026	Rain	5	5	1
Spring Migration	WB sp 30	5/9/2026	Partial sun	5	0	0
Spring Migration	WB sp 30	5/18/2026	Clear	8	10	2
Spring Migration	WB sp 30	5/31/2026	Overcast	3	10	2
Spring Migration	WB sp 31	4/29/2026	Rain	5	5	1
Spring Migration	WB sp 4	4/2/2025	Partial sun	-3	7.5	2
Spring Migration	WB sp 4	4/20/2026	Overcast	6	12.5	3
Spring Migration	WB sp 4	4/29/2026	Drizzle	4	5	1
Spring Migration	WB sp 4	5/9/2026	Partial sun	5	0	0
Spring Migration	WB sp 4	5/18/2026	Partial sun	15	20	4
Spring Migration	WB sp 4	5/24/2026	Clear	5	20	4
Spring Migration	WB sp 5	4/2/2025	Partial sun	-2	15	3
Spring Migration	WB sp 5	4/20/2026	Overcast	6	12.5	3
Spring Migration	WB sp 5	4/29/2026	Drizzle	4	5	1
Spring Migration	WB sp 5	5/9/2026	Partial sun	5	0	0
Spring Migration	WB sp 5	5/18/2026	Clear	17	20	4
Spring Migration	WB sp 5	5/31/2026	Overcast	5	12.5	3
Spring Migration	WB sp 6	4/2/2025	Partial sun	-2	15	3
Spring Migration	WB sp 6	4/20/2026	Overcast	6	12.5	3
Spring Migration	WB sp 6	4/29/2026	Drizzle	4	10	2
Spring Migration	WB sp 6	5/9/2026	Partial sun	5	0	0
Spring Migration	WB sp 6	5/18/2026	Clear	16	20	4
Spring Migration	WB sp 6	5/31/2026	Overcast	5	12.5	3
Spring Migration	WB sp 7	4/2/2025	Partial sun	-2	15	3
Spring Migration	WB sp 7	4/20/2026	Overcast	6	12.5	3
Spring Migration	WB sp 7	4/29/2026	Overcast	4	10	2
Spring Migration	WB sp 7	5/9/2026	Partial sun	5	0	0
Spring Migration	WB sp 7	5/18/2026	Clear	18	20	4
Spring Migration	WB sp 7	5/31/2026	Overcast	5	12.5	3
Spring Migration	WB sp 8	4/2/2025	Partial sun	-2	15	3
Spring Migration	WB sp 8	4/20/2026	Overcast	6	12.5	3
Spring Migration	WB sp 8	4/29/2026	Overcast	4	10	2
Spring Migration	WB sp 8	5/9/2026	Partial sun	5	0	0
Spring Migration	WB sp 8	5/18/2026	Clear	19	15	3
Spring Migration	WB sp 8	5/31/2026	Overcast	5	12.5	3
Spring Migration	WB sp 9	4/2/2025	Partial sun	-2	15	3
Spring Migration	WB sp 9	4/20/2026	Overcast	6	12.5	3
Spring Migration	WB sp 9	4/29/2026	Drizzle	4	10	2
Spring Migration	WB sp 9	5/9/2026	Partial sun	5	0	0
Spring Migration	WB sp 9	5/18/2026	Clear	8	10	2
Spring Migration	WB sp 9	5/31/2026	Overcast	5	12.5	3
Winter	WB	2/10/2025	Sun	-10	9	2
Winter	WB	3/3/2025	Sun	-5	14	3
Winter	WB	3/3/2025	Sun	-5	15	3
Winter	WB	3/4/2025	Sun	-5	22	4
Winter	WB	3/4/2025	Sun	-5	22	4
Winter	WB wi 1	2/16/2026	Overcast	-5	5	1
Winter	WB wi 1	3/7/2026	Overcast	-5	7.5	2
Winter	WB wi 1	3/25/2026	Overcast	-2	10	2
Winter	WB wi 11	2/17/2026	Partial sun	-8	7.5	2

Appendix I - Table 3: Survey Locations

Survey Program	Survey Location	Date Surveyed	Weather	Temp (°C)	Wind (km)	Wind (Beaufort)
Winter	WB wi 11	3/6/2026	Overcast	-15	7.5	2
Winter	WB wi 11	3/28/2026	Partial sun	-10	10	2
Winter	WB wi 12	2/17/2026	Partial sun	-8	7.5	2
Winter	WB wi 12	3/6/2026	Overcast	-15	7.5	2
Winter	WB wi 12	3/28/2026	Partial sun	-10	10	2
Winter	WB wi 13	2/17/2026	Partial sun	-8	7.5	2
Winter	WB wi 13	3/6/2026	Overcast	-15	7.5	2
Winter	WB wi 13	3/28/2026	Partial sun	-10	10	2
Winter	WB wi 14	2/17/2026	Partial sun	-8	7.5	2
Winter	WB wi 14	3/6/2026	Overcast	-15	7.5	2
Winter	WB wi 14	3/28/2026	Partial sun	-10	10	2
Winter	WB wi 15	2/17/2026	Partial sun	-8	7.5	2
Winter	WB wi 15	3/6/2026	Overcast	-15	7.5	2
Winter	WB wi 15	3/28/2026	Partial sun	-10	10	2
Winter	WB wi 16	2/17/2026	Partial sun	-2	12.5	3
Winter	WB wi 16	3/6/2026	Overcast	-15	7.5	2
Winter	WB wi 16	3/28/2026	Partial sun	-10	10	2
Winter	WB wi 17	2/17/2026	Partial sun	-2	12.5	3
Winter	WB wi 17	3/6/2026	Overcast	-15	7.5	2
Winter	WB wi 17	3/28/2026	Partial sun	-10	10	2
Winter	WB wi 18	2/17/2026	Partial sun	-2	12.5	3
Winter	WB wi 18	3/6/2026	Overcast	-15	7.5	2
Winter	WB wi 18	3/28/2026	Partial sun	-10	10	2
Winter	WB wi 19	2/17/2026	Partial sun	-2	12.5	3
Winter	WB wi 19	3/6/2026	Overcast	-15	7.5	2
Winter	WB wi 19	3/28/2026	Partial sun	-10	10	2
Winter	WB wi 2	2/16/2026	Overcast	-5	5	1
Winter	WB wi 2	3/7/2026	Overcast	-3	12.5	3
Winter	WB wi 2	3/25/2026	Partial sun	0	17.5	3
Winter	WB wi 20	2/17/2026	Partial sun	-2	12.5	3
Winter	WB wi 20	3/6/2026	Overcast	-15	7.5	2
Winter	WB wi 20	3/28/2026	Partial sun	-10	10	2
Winter	WB wi 3	2/16/2026	Overcast	-5	5	1
Winter	WB wi 3	3/7/2026	Overcast	-3	12.5	3
Winter	WB wi 3	3/25/2026	Partial sun	0	17.5	3
Winter	WB wi 4	2/16/2026	Overcast	-5	5	1
Winter	WB wi 4	3/7/2026	Overcast	-5	7.5	2
Winter	WB wi 4	3/25/2026	Overcast	-2	10	2
Winter	WB wi 5	2/16/2026	Overcast	-5	5	1
Winter	WB wi 5	3/7/2026	Overcast	-3	12.5	3
Winter	WB wi 5	3/25/2026	Overcast	-2	10	2
Winter	WB wi 6	2/16/2026	Overcast	-5	5	1
Winter	WB wi 6	3/7/2026	Overcast	-3	12.5	3
Winter	WB wi 6	3/25/2026	Partial sun	0	17.5	3
Winter	WB wi 7	2/16/2026	Overcast	-5	5	1
Winter	WB wi 7	3/7/2026	Overcast	-3	12.5	3
Winter	WB wi 7	3/25/2026	Partial sun	0	17.5	3
Winter	WB wi 8	2/16/2026	Overcast	-5	5	1
Winter	WB wi 8	3/7/2026	Overcast	-3	22.5	4
Winter	WB wi 8	3/25/2026	Partial sun	0	17.5	3
Winter	WB wi 9	2/16/2026	Overcast	-5	5	1

Appendix I - Table 3: Survey Locations

Survey Program	Survey Location	Date Surveyed	Weather	Temp (°C)	Wind (km)	Wind (Beaufort)
Winter	WB wi 9	3/7/2026	Overcast	-3	12.5	3
Winter	WB wi 9	3/25/2026	Partial sun	0	17.5	3
Winter	WB01	1/14/2025	Overcast	-3	7	2
Winter	WB01	1/14/2025	Overcast	-3	7	2
Winter	WB01	1/14/2025	Overcast	-3	7	2
Winter	WB01	1/14/2025	Overcast	-3	7	2
Winter	WB01	1/14/2025	Overcast	-3	7	2
Winter	WB01	1/14/2025	Overcast	-3	7	2
Winter	WB01	1/14/2025	Overcast	-3	7	2
Winter	WB01	1/14/2025	Overcast	-3	7	2
Winter	WB01	1/14/2025	Overcast	-3	7	2
Winter	WB01	1/14/2025	Overcast	-3	7	2
Winter	WB01	1/14/2025	Overcast	-3	7	2
Winter	WB01	1/14/2025	Overcast	-3	7	2
Winter	WB01	2/11/2025	Sun	-12	17	3
Winter	WB02	1/14/2025	Overcast	-3	7	2
Winter	WB02	1/14/2025	Overcast	-3	7	2
Winter	WB02	1/14/2025	Overcast	-3	7	2
Winter	WB02	1/14/2025	Overcast	-3	7	2
Winter	WB02	1/14/2025	Overcast	-3	7	2
Winter	WB02	1/14/2025	Overcast	-3	7	2
Winter	WB02	1/14/2025	Overcast	-3	7	2
Winter	WB02	1/14/2025	Overcast	-3	7	2
Winter	WB05	1/14/2025	Overcast	-5	7	2
Winter	WB05	1/14/2025	Overcast	-5	7	2
Winter	WB05	1/14/2025	Overcast	-5	7	2
Winter	WB05	1/14/2025	Overcast	-5	7	2
Winter	WB05	1/14/2025	Overcast	-5	7	2
Winter	WB05	1/14/2025	Overcast	-5	7	2
Winter	WB05	1/14/2025	Overcast	-5	7	2
Winter	WB05	1/14/2025	Overcast	-5	7	2
Winter	WB06	1/15/2025	Overcast	-6	18	3
Winter	WB07	1/15/2025	Overcast	-6	18	3
Fall Passage Migration	HAWK1	9/10/2025	Partial sun	20	20	4
Fall Passage Migration	HAWK1	9/30/2025	Sun	20	25	4
Fall Passage Migration	HAWK1	9/30/2025	Sun	20	25	4
Fall Passage Migration	HAWK2	9/15/2025	Partial sun	20	20	4
Fall Passage Migration	HAWK2	9/20/2025	Clear	15	27.5	4
Fall Passage Migration	HAWK2	9/20/2025	Clear	15	27.5	4
Fall Passage Migration	HAWK2	9/20/2025	Clear	15	27.5	4
Fall Passage Migration	HAWK2	9/20/2025	Clear	15	27.5	4
Fall Passage Migration	HAWK2	9/20/2025	Clear	15	27.5	4
Fall Passage Migration	HAWK2	9/20/2025	Clear	15	27.5	4
Fall Passage Migration	HAWK2	9/30/2025	Sun	20	25	4
Fall Passage Migration	HAWK2	9/30/2025	Sun	20	25	4
Fall Passage Migration	HAWK2	9/30/2025	Sun	20	25	4
Fall Passage Migration	HAWK2	10/1/2025	Partial sun	10	17.5	3
Fall Passage Migration	HAWK2	10/1/2025	Partial sun	10	17.5	3
Fall Passage Migration	HAWK2	10/14/2025	Partial sun	10	15	3

Appendix I - Table 3: Survey Locations

Survey Program	Survey Location	Date Surveyed	Weather	Temp (°C)	Wind (km)	Wind (Beaufort)
Fall Passage Migration	HAWK2	10/15/2025	Partial sun	15	15	3
Fall Passage Migration	HAWK2	10/15/2025	Partial sun	15	15	3
Fall Passage Migration	HAWK2	10/15/2025	Partial sun	15	15	3
Fall Passage Migration	HAWK2	10/15/2025	Partial sun	15	15	3
Fall Passage Migration	HAWK3	10/22/2025	Partial sun	15	15	3
Fall Passage Migration	HAWK3	10/22/2025	Partial sun	15	15	3
Fall Passage Migration	HAWK3	10/22/2025	Partial sun	15	15	3
Fall Passage Migration	HAWK3	10/22/2025	Partial sun	15	15	3
Fall Passage Migration	HAWK3	10/22/2025	Partial sun	15	15	3
Fall Passage Migration	P01	8/27/2024	Clear	22	10	2
Fall Passage Migration	P01	8/27/2024	Clear	22	10	2
Fall Passage Migration	P01	8/27/2024	Clear	22	10	2
Fall Passage Migration	P01	8/27/2024	Clear	22	10	2
Fall Passage Migration	P01	8/27/2024	Clear	22	10	2
Fall Passage Migration	P01	8/27/2024	Clear	22	10	2
Fall Passage Migration	P01	8/27/2024	Clear	22	10	2
Fall Passage Migration	P01	8/27/2024	Clear	22	10	2
Fall Passage Migration	P01	9/12/2024	Clear	11	5	1
Fall Passage Migration	P01	9/12/2024	Clear	11	5	1
Fall Passage Migration	P01	9/12/2024	Clear	11	5	1
Fall Passage Migration	P01	9/12/2024	Clear	11	5	1
Fall Passage Migration	P01	9/12/2024	Clear	11	5	1
Fall Passage Migration	P01	9/12/2024	Clear	11	5	1
Fall Passage Migration	P01	9/12/2024	Clear	11	5	1
Fall Passage Migration	P01	9/12/2024	Clear	11	5	1
Fall Passage Migration	P01	9/12/2024	Clear	11	5	1
Fall Passage Migration	P01	9/12/2024	Clear	11	5	1
Fall Passage Migration	P01	9/12/2024	Clear	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1

Appendix I - Table 3: Survey Locations

Survey Program	Survey Location	Date Surveyed	Weather	Temp (°C)	Wind (km)	Wind (Beaufort)
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/2/2024	Overcast	11	5	1
Fall Passage Migration	P01	10/24/2024	Partial sun	14	2	1
Fall Passage Migration	P01	10/24/2024	Partial sun	14	2	1
Fall Passage Migration	P01	10/24/2024	Partial sun	14	2	1
Fall Passage Migration	P01	10/24/2024	Partial sun	14	2	1
Fall Passage Migration	P01	10/24/2024	Partial sun	14	2	1
Fall Passage Migration	P01	10/24/2024	Partial sun	14	2	1
Fall Passage Migration	P01	10/24/2024	Partial sun	14	2	1
Fall Passage Migration	P01	10/24/2024	Partial sun	14	2	1
Fall Passage Migration	P01	10/24/2024	Partial sun	14	2	1
Fall Passage Migration	P01	10/24/2024	Partial sun	14	2	1
Fall Passage Migration	P01	10/24/2024	Partial sun	14	2	1
Fall Passage Migration	P01	10/24/2024	Partial sun	14	2	1
Fall Passage Migration	P01	10/24/2024	Partial sun	14	2	1
Fall Passage Migration	P01	10/24/2024	Partial sun	14	2	1
Fall Passage Migration	P01	10/24/2024	Partial sun	14	2	1
Fall Passage Migration	P01	10/24/2024	Partial sun	14	2	1
Fall Passage Migration	P01	11/8/2024	Overcast	8	30	5
Fall Passage Migration	P01	11/8/2024	Overcast	8	30	5
Fall Passage Migration	P01	11/8/2024	Overcast	8	30	5
Fall Passage Migration	P01	11/8/2024	Overcast	8	30	5
Fall Passage Migration	P01	11/8/2024	Overcast	8	30	5
Fall Passage Migration	P01	11/8/2024	Overcast	8	30	5
Spring Passage Migration	HAWK1	4/2/2026	Overcast	3	22.5	4
Spring Passage Migration	HAWK1	4/2/2026	Overcast	3	22.5	4
Spring Passage Migration	HAWK1	4/2/2026	Overcast	3	22.5	4
Spring Passage Migration	HAWK1	4/20/2026	Partial sun	10	17.5	3
Spring Passage Migration	HAWK1	4/20/2026	Partial sun	10	17.5	3
Spring Passage Migration	HAWK1	4/20/2026	Partial sun	10	17.5	3
Spring Passage Migration	HAWK1	4/20/2026	Partial sun	10	17.5	3
Spring Passage Migration	HAWK1	4/20/2026	Partial sun	10	17.5	3
Spring Passage Migration	HAWK2	4/6/2026	Overcast	3	17.5	3
Spring Passage Migration	HAWK2	4/6/2026	Overcast	3	17.5	3
Spring Passage Migration	HAWK2	4/6/2026	Overcast	3	17.5	3
Spring Passage Migration	HAWK2	4/6/2026	Overcast	3	22.5	4
Spring Passage Migration	HAWK2	4/6/2026	Overcast	3	22.5	4
Spring Passage Migration	HAWK2	4/6/2026	Overcast	3	22.5	4
Spring Passage Migration	HAWK2	4/18/2026	Sun	15	17.5	3
Spring Passage Migration	HAWK2	4/18/2026	Sun	15	17.5	3

Appendix I - Table 3: Survey Locations

Survey Program	Survey Location	Date Surveyed	Weather	Temp (°C)	Wind (km)	Wind (Beaufort)
Spring Passage Migration	HAWK2	4/18/2026	Sun	15	17.5	3
Spring Passage Migration	HAWK2	4/18/2026	Sun	15	17.5	3
Spring Passage Migration	HAWK2	4/18/2026	Sun	15	17.5	3
Spring Passage Migration	HAWK2	5/9/2026	Partial sun	15	22.5	4
Spring Passage Migration	HAWK2	5/9/2026	Partial sun	15	22.5	4
Spring Passage Migration	HAWK2	5/9/2026	Partial sun	15	22.5	4
Spring Passage Migration	HAWK2	5/9/2026	Partial sun	15	22.5	4
Spring Passage Migration	HAWK3	4/29/2026	Overcast	10	12.5	3
Spring Passage Migration	HAWK3	4/29/2026	Overcast	10	12.5	3
Spring Passage Migration	HAWK3	4/29/2026	Overcast	10	12.5	3
Spring Passage Migration	HAWK3	4/29/2026	Overcast	10	12.5	3
Spring Passage Migration	HAWK3	4/29/2026	Overcast	10	12.5	3
Spring Passage Migration	HAWK3	4/29/2026	Overcast	10	12.5	3
Spring Passage Migration	HAWK4	4/26/2026	Clear	13	22.5	4
Spring Passage Migration	HAWK4	4/26/2026	Clear	13	22.5	4
Spring Passage Migration	HAWK4	4/26/2026	Clear	13	22.5	4
Spring Passage Migration	HAWK4	4/26/2026	Clear	13	22.5	4
Spring Passage Migration	HAWK4	4/26/2026	Clear	13	22.5	4
Spring Passage Migration	HAWK4	5/8/2026	Partial sun	12	17.5	3
Spring Passage Migration	HAWK4	5/8/2026	Partial sun	12	17.5	3
Spring Passage Migration	HAWK4	5/8/2026	Partial sun	12	17.5	3
Spring Passage Migration	HAWK4	5/8/2026	Partial sun	12	17.5	3
Spring Passage Migration	HAWK4	5/8/2026	Partial sun	12	17.5	3
Spring Passage Migration	HAWK4	5/8/2026	Partial sun	12	17.5	3
Spring Passage Migration	P01	4/16/2025	Partial sun	7	23	4
Spring Passage Migration	P01	5/13/2025	Sun	10	19	3
Spring Passage Migration	P01	5/28/2025	Sun	12	15	3

Appendix I - Table 4: All Programs AC CDC Summary

Functional Group	Scientific Name	Common Name	COSEWIC	SARA	NSESA	AC CDC	Breeding Birds	Fall Migration	Fall Passage Migration	Nightjar	Winter	Owls	Spring Migration	Spring Passage Migration	Total
Diurnal Raptors	*Falco sparverius*	American Kestrel				S3B,S4M	0	1	1	0	0	0	2	2	6
Diurnal Raptors	*Circus hudsonius*	Northern Harrier	NAR			S3B,S4M	0	1	1	0	0	0	0	3	5
Diurnal Raptors	*Astur atricapillus*	American Goshawk				S3S4	0	1	1	0	0	0	1	2	5
Diurnal Raptors	*Buteo jamaicensis*	Red-tailed Hawk	NAR			S4	1	3	14	0	0	0	1	9	28
Diurnal Raptors	*Accipiter striatus*	Sharp-shinned Hawk	NAR			S4	0	4	6	0	0	0	1	4	15
Diurnal Raptors	*Cathartes aura*	Turkey Vulture				S4B	0	1	22	0	0	0	3	29	55
Diurnal Raptors	*Falco columbarius*	Merlin	NAR			S4S5B	0	1	0	0	0	0	0	0	1
Diurnal Raptors	*Haliaeetus leucocephalus*	Bald Eagle	NAR			S5?	0	2	12	0	0	0	0	52	66
Diurnal Raptors	*Buteo platypterus*	Broad-winged Hawk				S5?B	0	2	6	0	0	0	2	5	15
Diurnal Raptors		Raptor sp.					0	0	4	0	0	0	0	5	9
Diurnal Raptors		Small raptor sp.					0	0	3	0	0	0	0	0	3
Diurnal Raptors		Buteo species					0	0	0	0	0	0	0	1	1
Diurnal Raptors		Hawk sp.					0	1	0	0	0	0	0	0	1
Nightjars	*Chordeiles minor*	Common Nighthawk	SC	SC	Threatened	S3S4B	0	0	0	7	0	0	0	0	7
Nocturnal Raptors	*Strix varia*	Barred Owl				S4	0	2	0	0	0	3	3	0	8
Nocturnal Raptors	*Bubo virginianus*	Great Horned Owl				S4	0	0	0	0	1	0	0	0	1
Nocturnal Raptors	*Aegolius acadicus*	Northern Saw-whet Owl				S4?B	0	0	0	0	0	3	0	1	4
Other Landbirds	*Picoides arcticus*	Black-backed Woodpecker				S3S4	0	2	0	0	0	0	0	0	2
Other Landbirds	*Canachites canadensis*	Spruce Grouse				S4	0	11	3	0	1	0	1	0	16
Other Landbirds	*Bonasa umbellus*	Ruffed Grouse				S5	0	20	0	1	7	0	50	0	78
Other Landbirds	*Dryobates villosus*	Hairy Woodpecker				S5	1	22	1	0	7	0	20	1	52
Other Landbirds	*Dryocopus pileatus*	Pileated Woodpecker				S5	2	20	1	0	4	0	19	0	46
Other Landbirds	*Dryobates pubescens*	Downy Woodpecker				S5	1	16	1	0	3	0	10	1	32
Other Landbirds	*Colaptes auratus*	Northern Flicker				S5B	4	23	1	0	4	0	54	2	88
Other Landbirds	*Sphyrapicus varius*	Yellow-bellied Sapsucker				S5B	1	0	0	0	0	0	31	0	32
Other Landbirds	*Archilochus colubris*	Ruby-throated Hummingbird				S5B	0	0	3	0	0	0	1	2	6
Other Landbirds	*Columba livia*	Rock Pigeon				SNA	0	0	1	0	0	0	0	0	1
Other Landbirds		Woodpecker sp.					0	0	0	0	3	0	24	0	27
Other Landbirds		Grouse sp.					2	0	0	0	0	0	0	0	2
Passerines	*Pooecetes gramineus*	Vesper Sparrow				S1S2B,SUM	0	1	0	0	0	0	0	0	1
Passerines	*Cardellina canadensis*	Canada Warbler	SC	SC	Endangered	S2S3B	0	2	0	0	0	0	0	0	2
Passerines	*Euphagus carolinus*	Rusty Blackbird	SC	SC	Endangered	S2S3B	0	0	1	0	0	0	0	0	1
Passerines	*Pinicola enucleator*	Pine Grosbeak				S2S3B,S5N	1	1	0	0	21	0	1	0	24
Passerines	*Perisoreus canadensis*	Canada Jay				S3	1	10	1	0	3	0	8	1	24
Passerines	*Poecile hudsonicus*	Boreal Chickadee				S3	1	6	3	0	4	0	1	1	16
Passerines	*Setophaga pinus*	Pine Warbler				S3?B	0	1	0	0	0	0	0	0	1
Passerines	*Setophaga striata*	Blackpoll Warbler				S3?B,S5M	4	139	2	0	0	0	2	0	147
Passerines	*Contopus cooperi*	Olive-sided Flycatcher	SC	SC	Threatened	S3B	2	0	0	0	0	0	4	0	6
Passerines	*Hirundo rustica*	Barn Swallow	SC	SC	Endangered	S3B	0	1	0	0	0	0	0	0	1
Passerines	*Coccothraustes vespertinus*	Evening Grosbeak	SC	SC	Vulnerable	S3B,S3N	3	1	2	0	3	0	9	0	18
Passerines	*Cardellina pusilla*	Wilson's Warbler				S3B,S4M	0	2	0	0	0	0	0	0	2
Passerines	*Leiothlypis peregrina*	Tennessee Warbler				S3B,S5M	0	0	0	0	0	0	1	0	1
Passerines	*Contopus virens*	Eastern Wood-Pewee	SC	SC	Vulnerable	S3S4B	2	0	0	0	0	0	0	0	2
Passerines	*Pheucticus ludovicianus*	Rose-breasted Grosbeak				S3S4B	1	0	0	0	0	0	0	0	1
Passerines	*Corvus corax*	Common Raven				S4	1	65	24	0	57	0	53	22	222
Passerines	*Spinus pinus*	Pine Siskin				S4	0	179	4	0	0	0	18	4	205
Passerines	*Loxia curvirostra*	Red Crossbill				S4	0	6	0	0	6	0	117	3	132
Passerines	*Setophaga virens*	Black-throated Green Warbler				S4B	64	68	0	0	0	0	110	6	248
Passerines	*Setophaga castanea*	Bay-breasted Warbler				S4B	4	4	0	0	0	0	17	0	25
Passerines	*Setophaga caerulescens*	Black-throated Blue Warbler				S4B	4	2	0	0	0	0	19	0	25
Passerines	*Spizella passerina*	Chipping Sparrow				S4B	12	1	0	0	0	0	1	0	14
Passerines	*Melospiza lincolnii*	Lincoln's Sparrow				S4B	0	8	0	0	0	0	2	0	10
Passerines	*Geothlypis philadelphia*	Mourning Warbler				S4B	3	0	0	0	0	0	3	0	6
Passerines	*Sialia sialis*	Eastern Bluebird	NAR			S4B	0	2	0	0	0	0	0	0	2
Passerines	*Catharus ustulatus*	Swainson's Thrush				S4B,S5M	41	12	0	0	0	0	16	1	70

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Functional Group	Scientific Name	Common Name	COSEWIC	SARA	NSESA	AC CDC	Breeding Birds	Fall Migration	Fall Passage Migration	Nightjar	Winter	Owls	Spring Migration	Spring Passage Migration	Total
Passerines	*Corthylio calendula*	Ruby-crowned Kinglet				S4B,S5M	7	22	0	0	0	0	12	1	42
Passerines	*Leiothlypis ruficapilla*	Nashville Warbler				S4B,S5M	11	8	0	0	0	0	13	0	32
Passerines	*Empidonax flaviventris*	Yellow-bellied Flycatcher				S4B,S5M	11	0	0	0	0	0	3	0	14
Passerines	*Passerculus sandwichensis*	Savannah Sparrow				S4B,S5M	0	4	0	0	0	0	6	0	10
Passerines	*Spizelloides arborea*	American Tree Sparrow				S4N	0	1	0	0	0	0	0	0	1
Passerines	*Calcarius lapponicus*	Lapland Longspur				S4N	0	1	0	0	0	0	0	0	1
Passerines	*Plectrophenax nivalis*	Snow Bunting				S4N	0	1	0	0	0	0	0	0	1
Passerines	*Acanthis flammea*	Redpoll				S4N	0	0	0	0	21	0	0	9	30
Passerines	*Loxia leucoptera*	White-winged Crossbill				S4S5	0	26	44	0	0	0	1	0	71
Passerines	*Setophaga magnolia*	Magnolia Warbler				S4S5B	67	46	1	0	0	0	86	2	202
Passerines	*Tachycineta bicolor*	Tree Swallow				S4S5B	0	0	0	0	0	0	4	3	7
Passerines	*Catharus fuscescens*	Veery				S4S5B	2	0	0	0	0	0	0	0	2
Passerines	*Zonotrichia albicollis*	White-throated Sparrow				S4S5B,S5M	89	123	0	0	0	0	144	6	362
Passerines	*Agelaius phoeniceus*	Red-winged Blackbird				S4S5B,SUN	0	0	0	0	0	0	2	1	3
Passerines	*Junco hyemalis*	Dark-eyed Junco				S5	39	222	8	0	9	0	87	15	380
Passerines	*Poecile atricapillus*	Black-capped Chickadee				S5	14	164	13	0	61	0	50	4	306
Passerines	*Regulus satrapa*	Golden-crowned Kinglet				S5	21	195	2	0	30	0	38	5	291
Passerines	*Cyanocitta cristata*	Blue Jay				S5	12	110	88	0	3	0	26	2	241
Passerines	*Spinus tristis*	American Goldfinch				S5	7	76	9	0	6	0	48	8	154
Passerines	*Corvus brachyrhynchos*	American Crow				S5	6	77	5	0	23	0	21	3	135
Passerines	*Sitta canadensis*	Red-breasted Nuthatch				S5	3	33	0	0	7	0	25	1	69
Passerines	*Zenaida macroura*	Mourning Dove				S5	20	7	1	0	0	0	19	2	49
Passerines	*Certhia americana*	Brown Creeper				S5	1	22	2	0	1	0	4	0	30
Passerines	*Sitta carolinensis*	White-breasted Nuthatch				S5?	0	4	1	0	0	0	0	0	5
Passerines	*Cardinalis cardinalis*	Northern Cardinal				S5?	0	2	0	0	0	0	0	0	2
Passerines	*Setophaga coronata*	Yellow-rumped Warbler				S5B	14	117	5	0	0	0	116	10	262
Passerines	*Seiurus aurocapilla*	Ovenbird				S5B	39	7	0	0	0	0	124	4	174
Passerines	*Bombycilla cedrorum*	Cedar Waxwing				S5B	18	120	26	0	2	0	0	0	166
Passerines	*Catharus guttatus*	Hermit Thrush				S5B	53	28	0	0	0	0	70	5	156
Passerines	*Geothlypis trichas*	Common Yellowthroat				S5B	37	44	0	0	0	0	55	1	137
Passerines	*Mniotilta varia*	Black-and-White Warbler				S5B	27	14	0	0	0	0	56	7	104
Passerines	*Vireo olivaceus*	Red-eyed Vireo				S5B	58	28	1	0	0	0	17	0	104
Passerines	*Vireo solitarius*	Blue-headed Vireo				S5B	6	28	0	0	0	0	62	4	100
Passerines	*Setophaga palmarum*	Palm Warbler				S5B	12	42	1	0	0	0	36	1	92
Passerines	*Setophaga ruticilla*	American Redstart				S5B	31	6	0	0	0	0	43	10	90
Passerines	*Setophaga americana*	Northern Parula				S5B	17	19	0	0	0	0	46	0	82
Passerines	*Setophaga pensylvanica*	Chestnut-sided Warbler				S5B	9	3	0	0	0	0	42	0	54
Passerines	*Troglodytes hiemalis*	Winter Wren				S5B	13	4	0	0	0	0	32	3	52
Passerines	*Empidonax alnorum*	Alder Flycatcher				S5B	33	0	0	0	0	0	11	2	46
Passerines	*Melospiza melodia*	Song Sparrow				S5B	2	21	0	0	2	0	20	0	45
Passerines	*Empidonax minimus*	Least Flycatcher				S5B	12	2	0	0	0	0	9	0	23
Passerines	*Setophaga fusca*	Blackburnian Warbler				S5B	5	4	0	0	0	0	11	0	20
Passerines	*Melospiza georgiana*	Swamp Sparrow				S5B	0	11	1	0	0	0	3	0	15
Passerines	*Setophaga petechia*	Yellow Warbler				S5B	5	0	0	0	0	0	6	1	12
Passerines	*Sayornis phoebe*	Eastern Phoebe				S5B	0	0	0	0	0	0	1	0	1
Passerines	*Dumetella carolinensis*	Gray Catbird				S5B	0	1	1	0	0	0	0	0	2
Passerines	*Haemorhous purpureus*	Purple Finch				S5B,S4N	7	85	15	0	0	0	63	5	175
Passerines	*Turdus migratorius*	American Robin				S5B,S5N	47	73	55	0	3	0	142	19	339
Passerines	*Quiscalus quiscula*	Common Grackle				S5B,SUN	0	43	0	0	1	0	2	1	47
Passerines	*Sturnus vulgaris*	European Starling				SNA	0	1	0	0	0	0	0	0	1
Passerines	*Leiothlypis ruficapilla ridgwayi*	Nashville Warbler				SNA	0	0	0	0	0	0	0	1	1
Passerines		Warbler sp.					0	38	4	0	0	0	0	6	48
Passerines		Finch sp.					0	0	15	0	0	0	0	0	15
Passerines		Passerine sp.					0	0	9	0	0	0	0	0	9
Shorebirds	*Charadrius vociferus*	Killdeer				S3B	0	0	0	0	0	0	3	0	3

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Functional Group	Scientific Name	Common Name	COSEWIC	SARA	NSESA	AC CDC	Breeding Birds	Fall Migration	Fall Passage Migration	Nightjar	Winter	Owls	Spring Migration	Spring Passage Migration	Total
Shorebirds	*Tringa flavipes*	Lesser Yellowlegs	T			S3S4M	0	0	1	0	0	0	0	0	1
Shorebirds	*Larus argentatus*	Herring Gull				S4	0	0	4	0	0	0	2	4	10
Shorebirds	*Scolopax minor*	American Woodcock				S4B	0	0	0	2	0	0	0	0	2
Shorebirds	*Larus delawarensis*	Ring-billed Gull				SUB,S4N	0	0	3	0	0	0	0	0	3
Waterbirds	*Antigone canadensis*	Sandhill Crane				S1B	0	0	0	0	0	0	0	2	2
Waterbirds	*Gavia immer*	Common Loon	NAR			S4B,S4N	1	1	0	0	0	0	0	0	2
Waterbirds	*Megaceryle alcyon*	Belted Kingfisher				S4B,SUN	0	1	3	0	0	0	1	0	5
Waterbirds	*Nannopterum auritum*	Double-crested Cormorant	NAR			S5B	0	0	1	0	0	0	11	5	17
Waterfowl	*Branta canadensis*	Canada Goose				S5B,S5N	0	15	0	0	3	0	3	1	22
Waterfowl	*Anas platyrhynchos*	Mallard				S5B,S5N	0	0	0	0	0	0	1	0	1
Waterfowl		Scaup sp.					0	0	0	0	0	0	0	1	1