

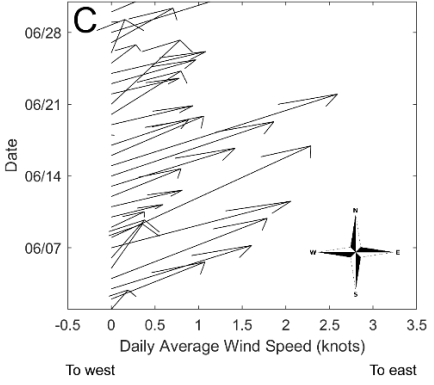
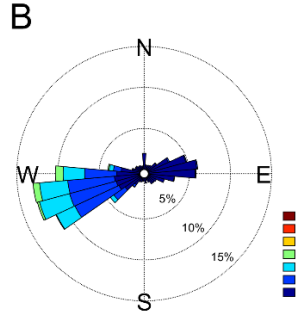
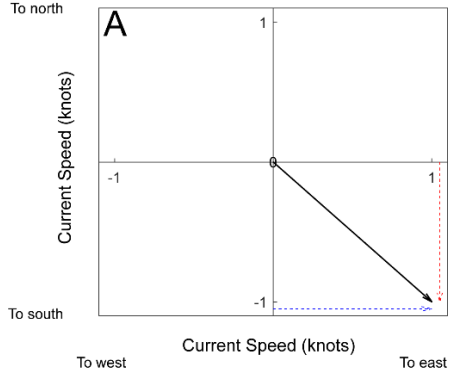
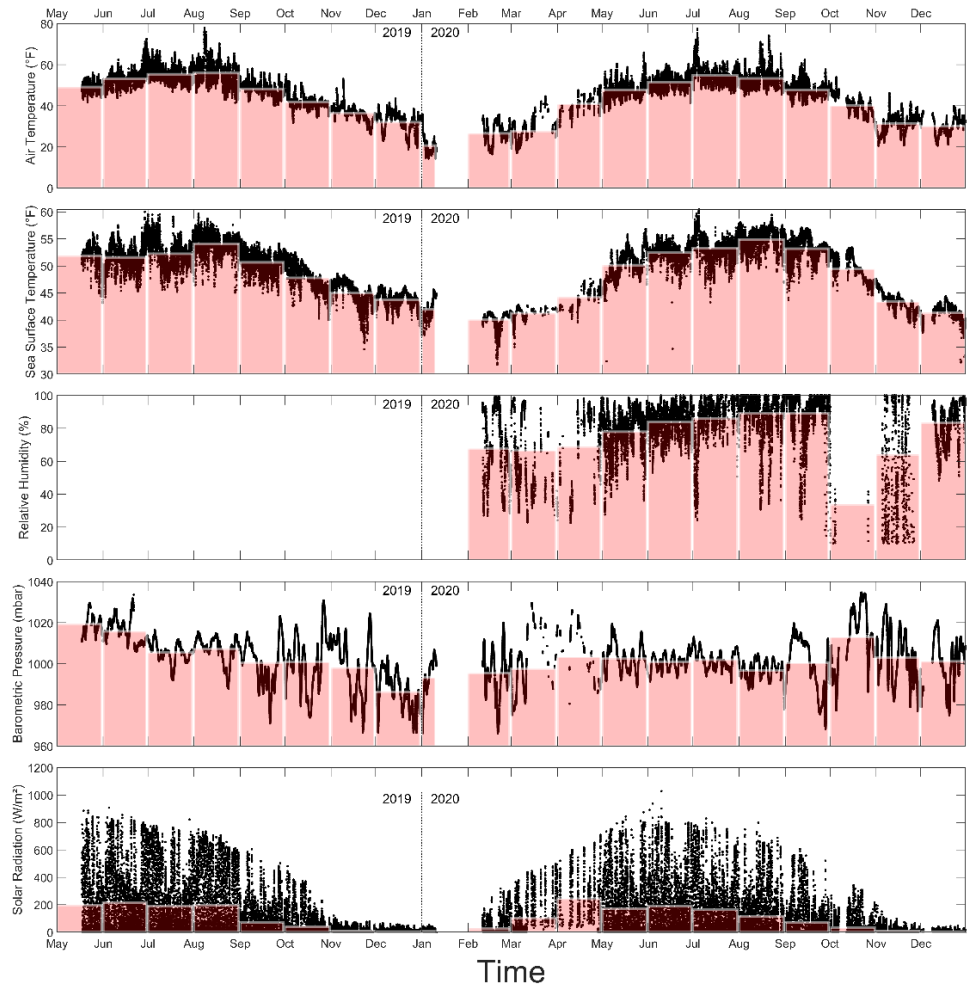
Port Valdez Weather Buoy Analysis

PWSRCAC Board, Sept. 21 2023

Rob Campbell

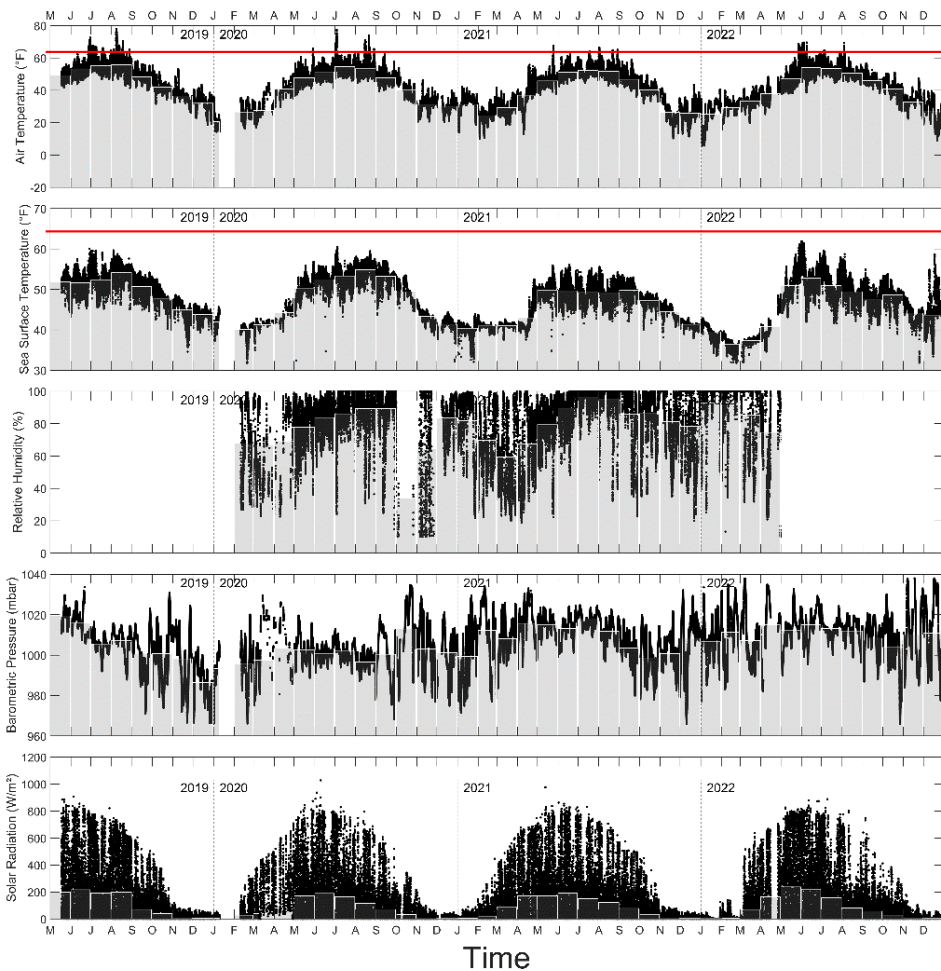


Scalars vs vectors

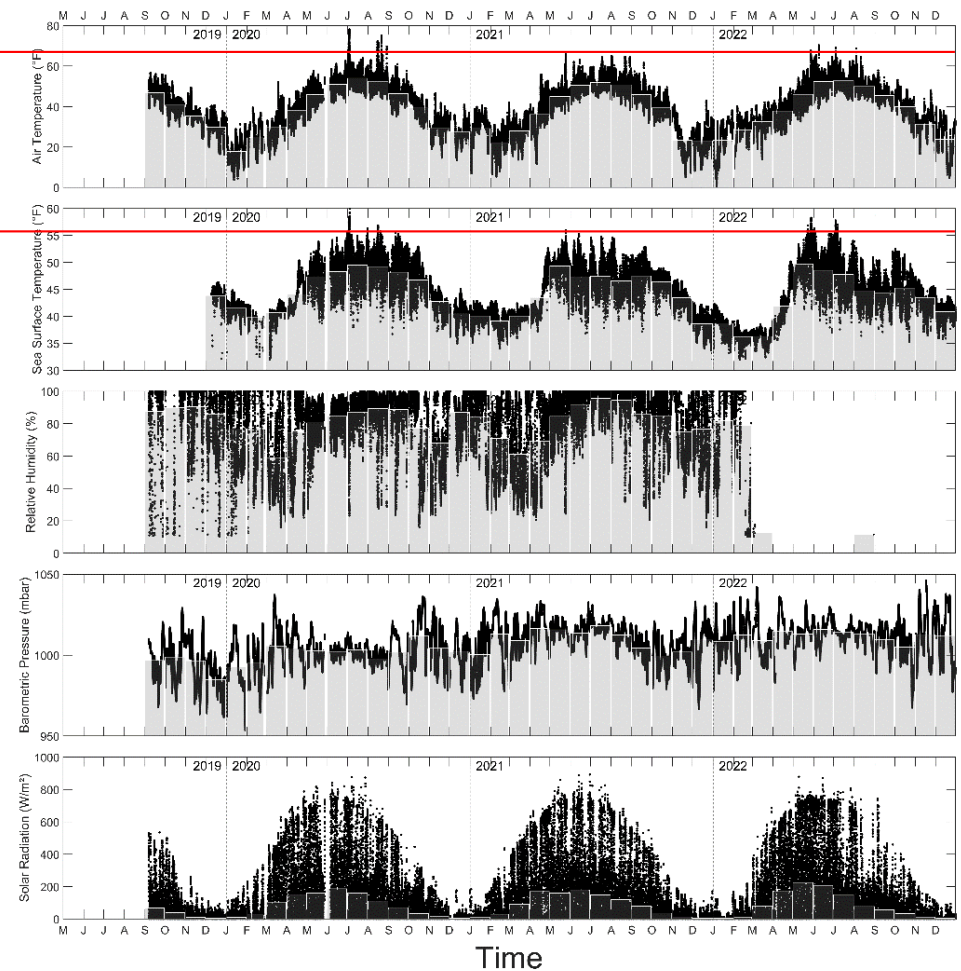


Monthly averages – met and oceanographic

VMT

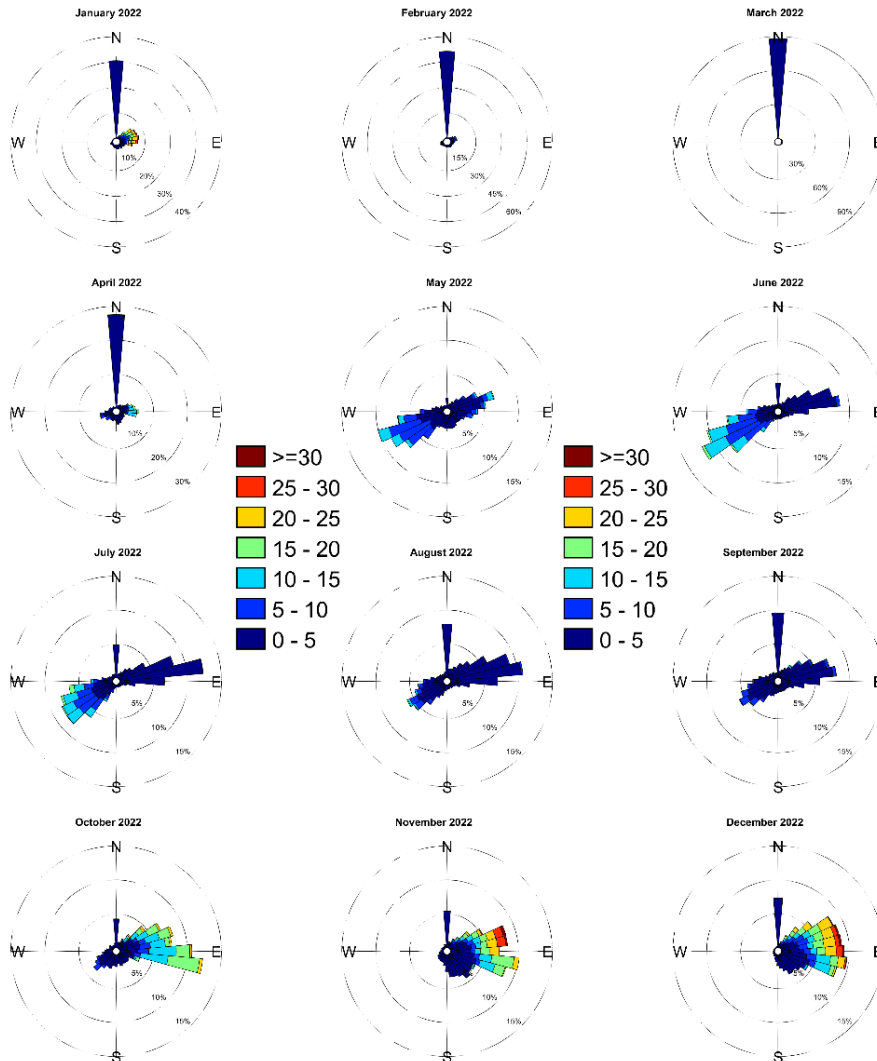


Duck Flats

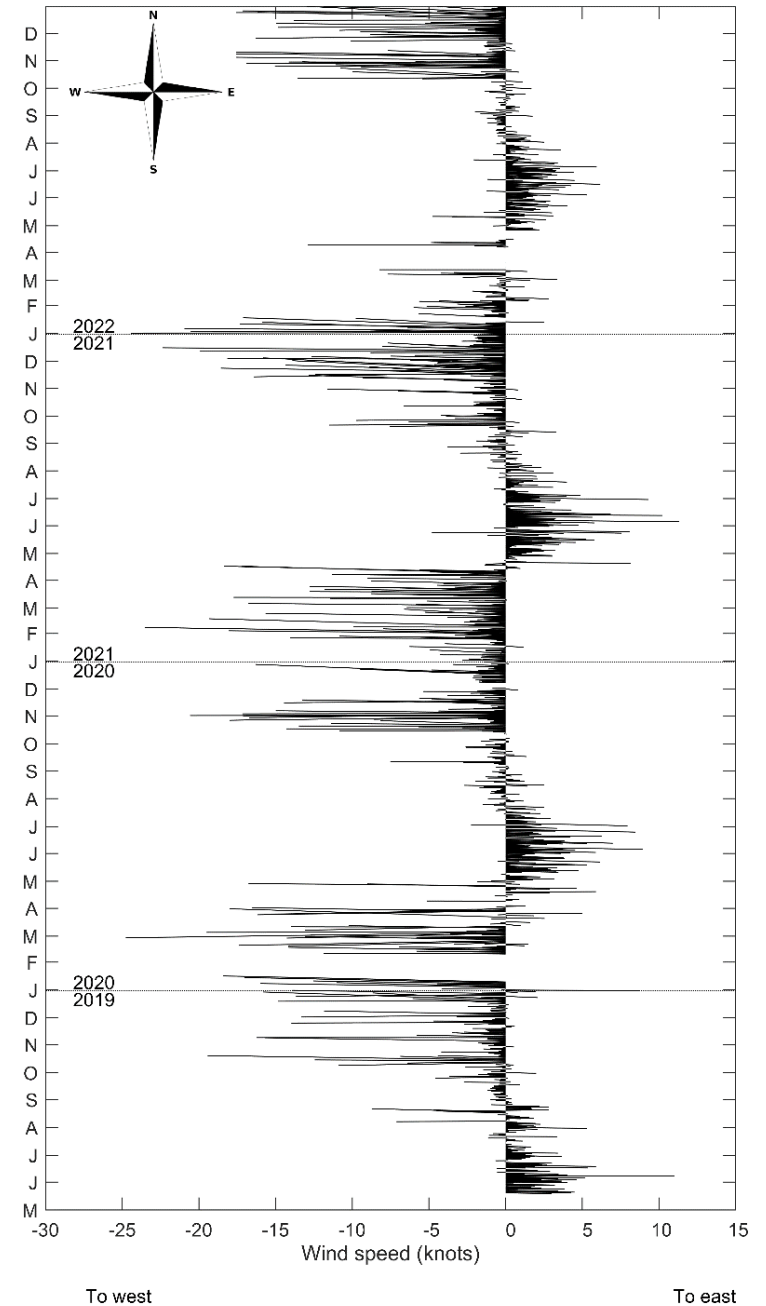


Winds - VMT

2022 wind roses

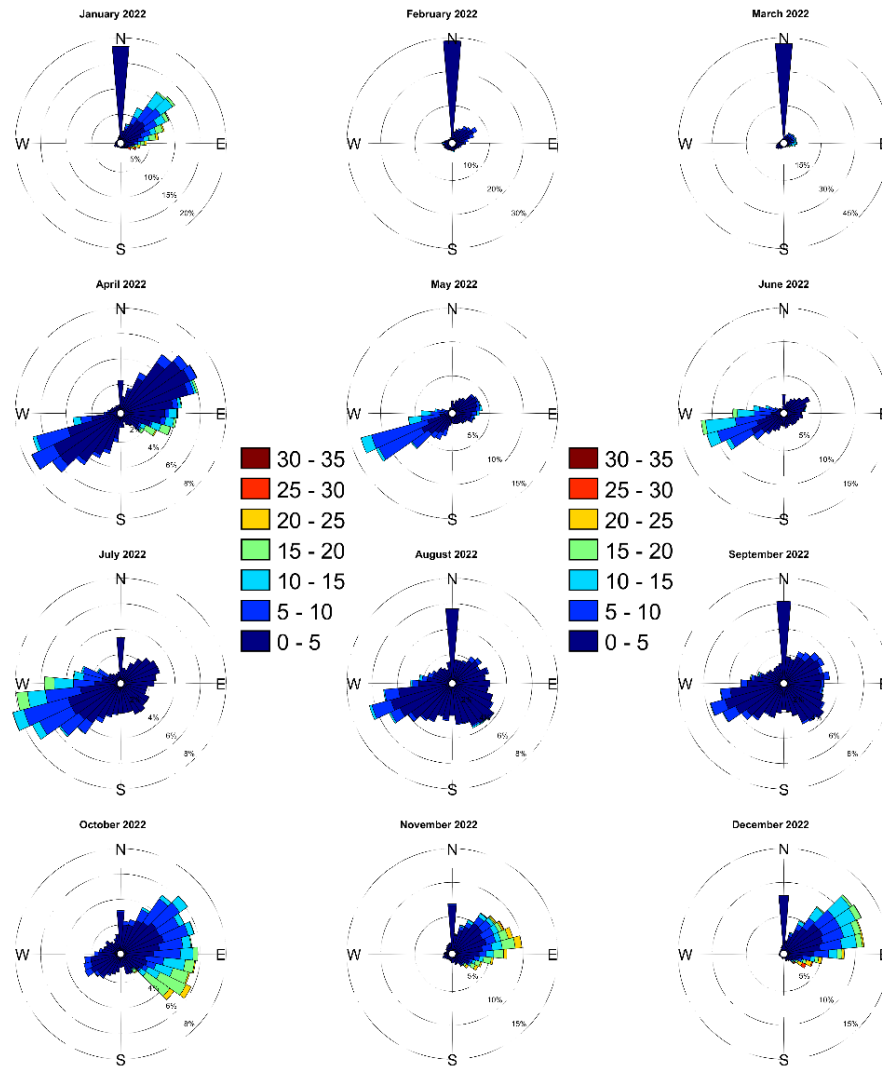


Full time series

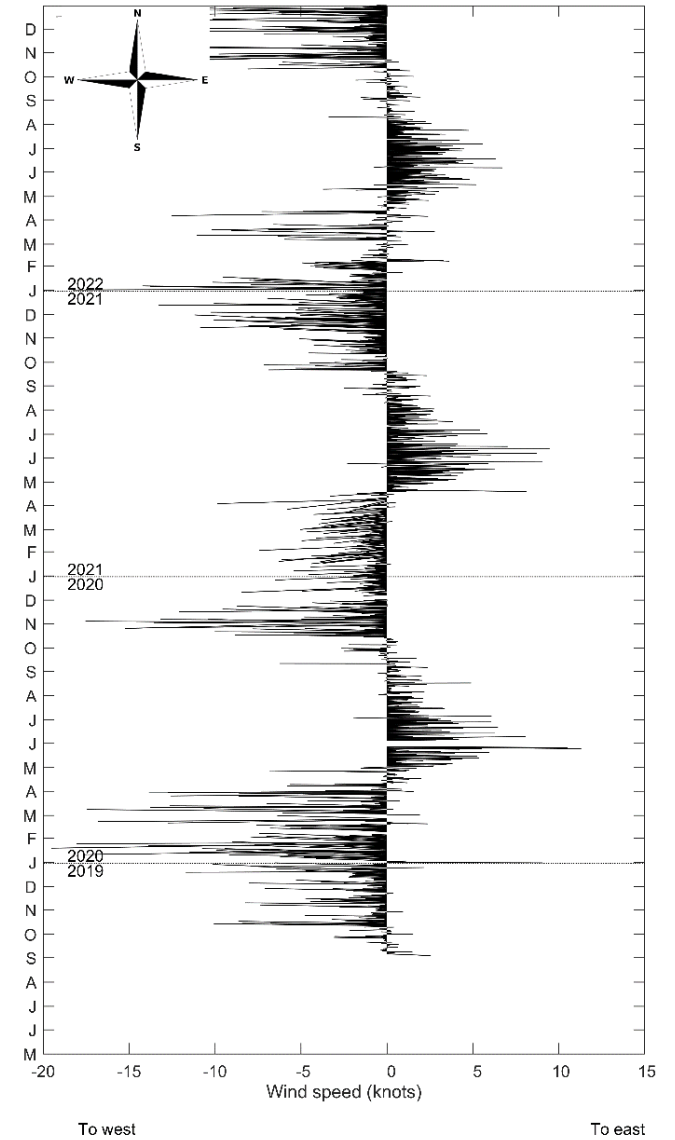


Winds – Duck Flats

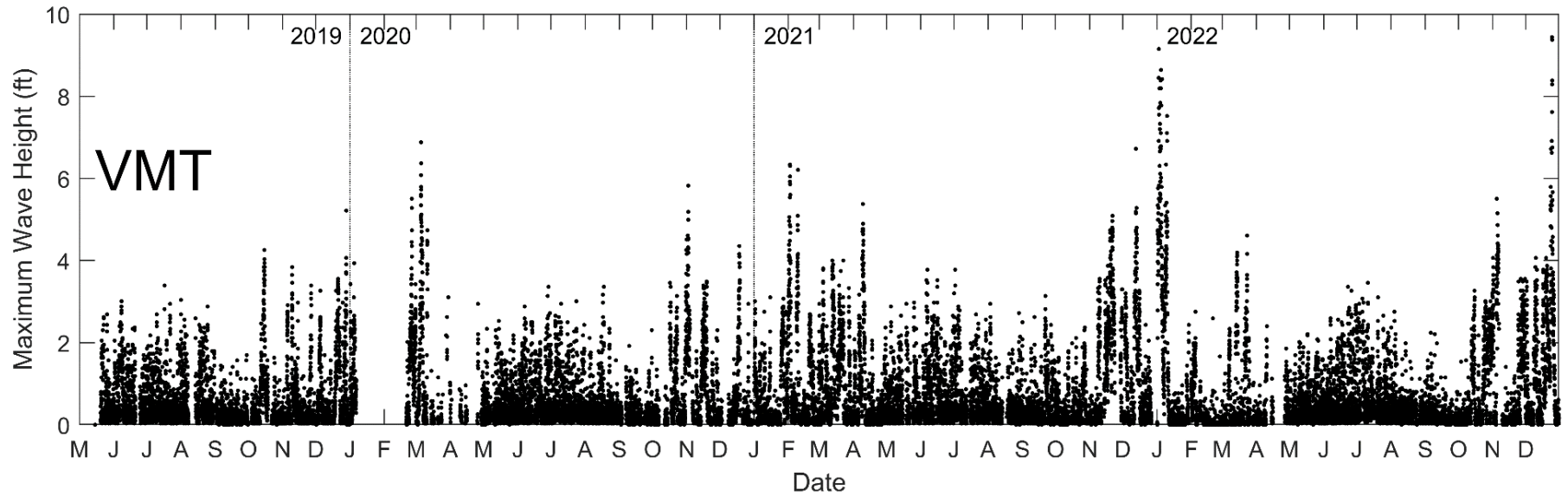
2022 wind roses



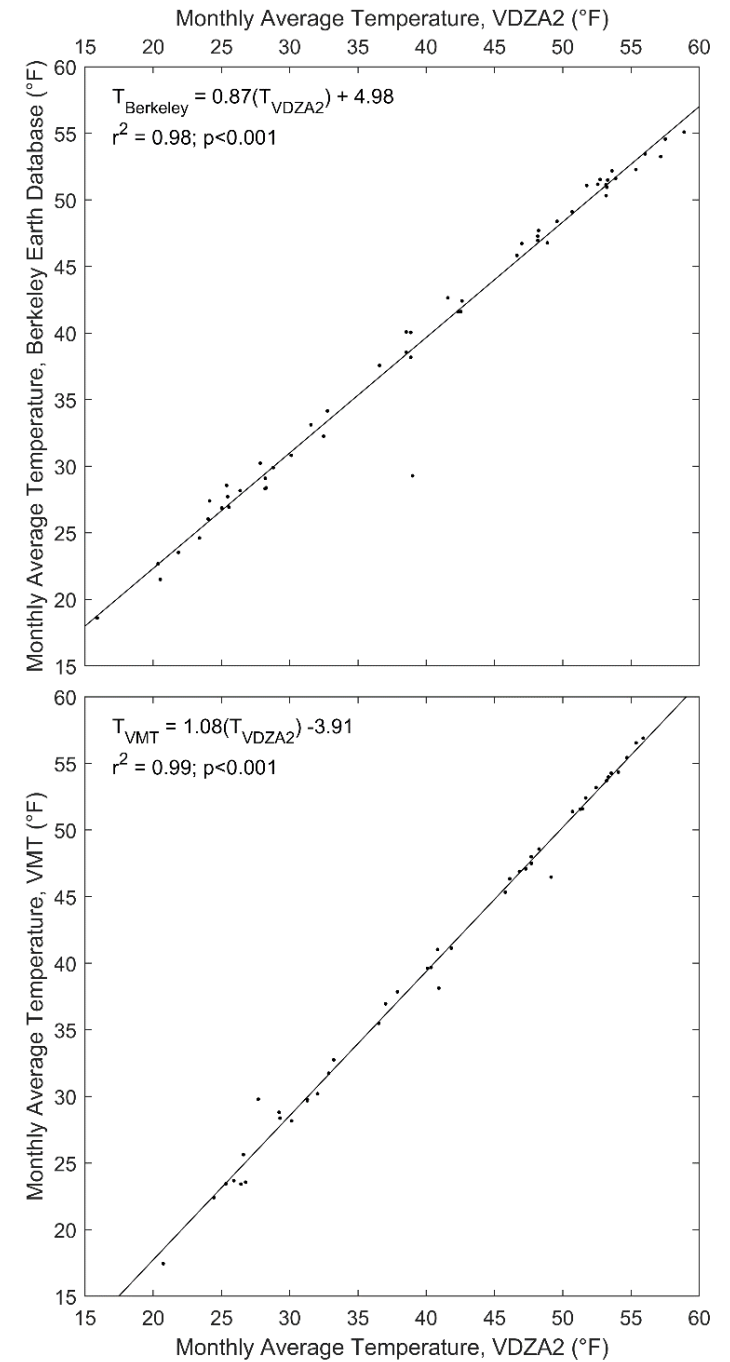
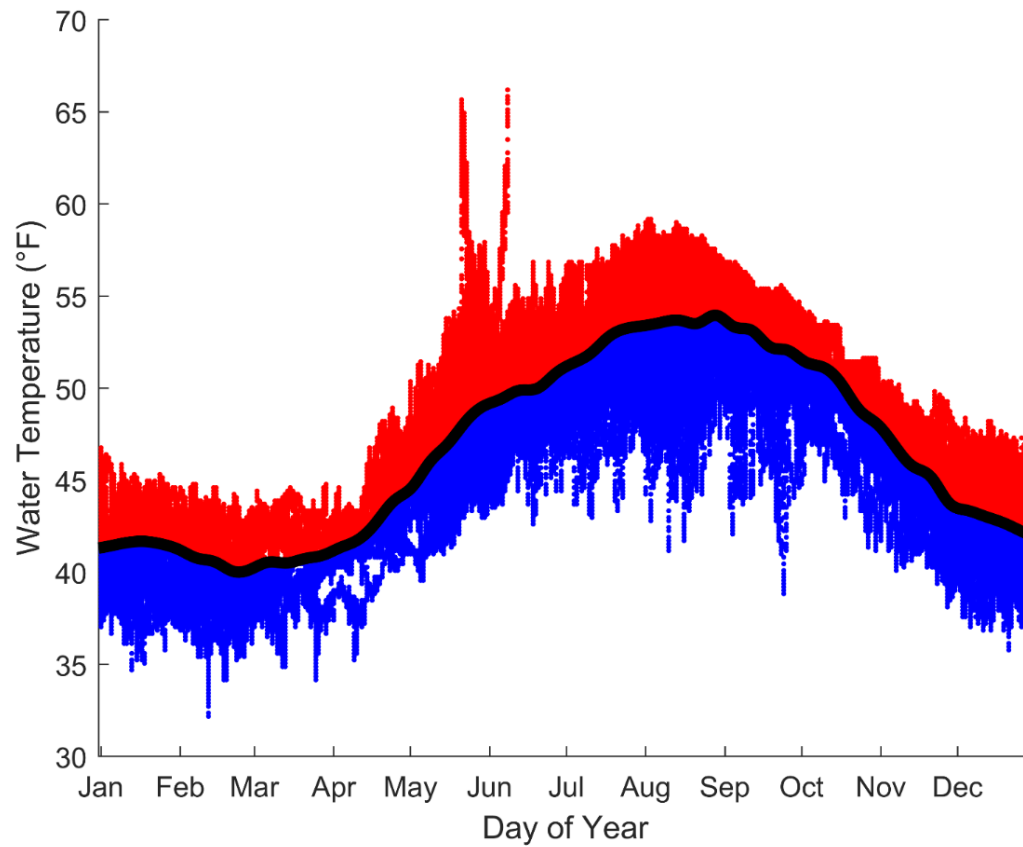
Full time series



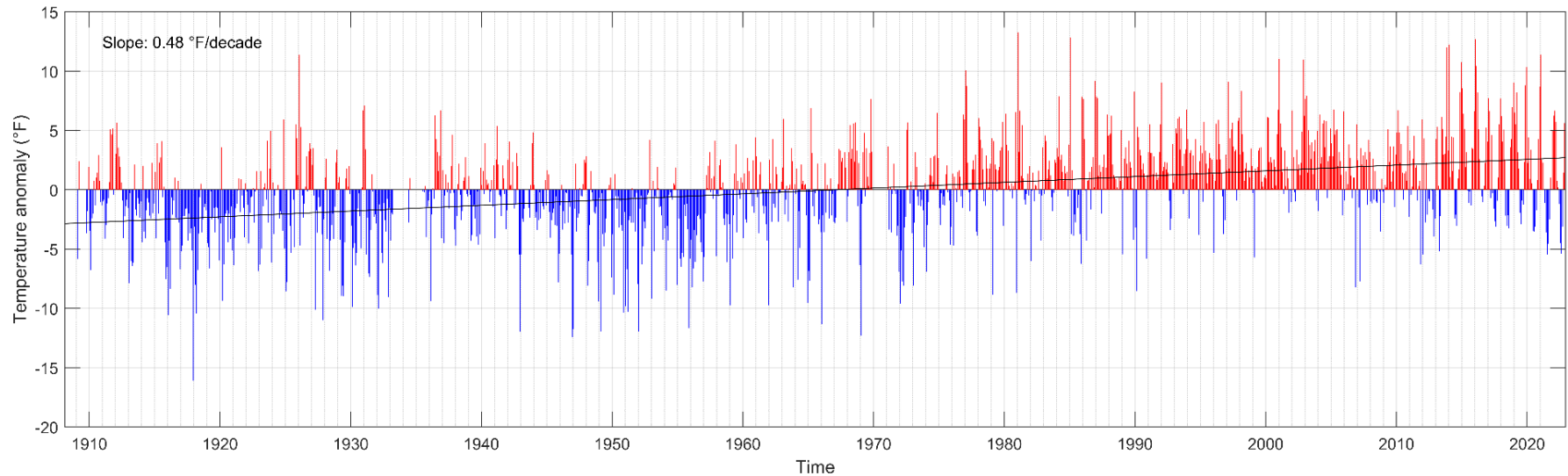
Max wave height - VMT



Temperature anomalies

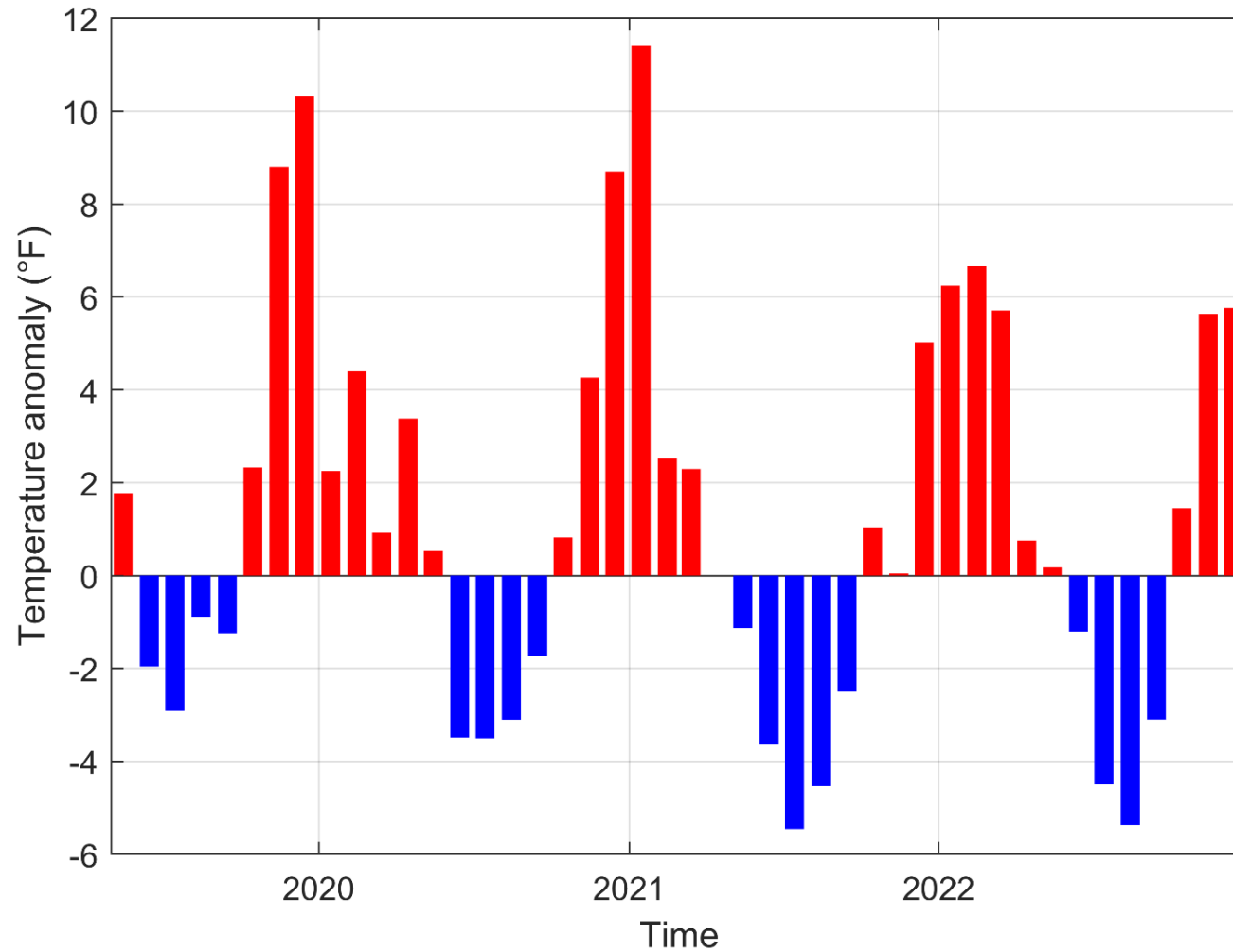


VDZ monthly air temperature anomaly 1908-2022

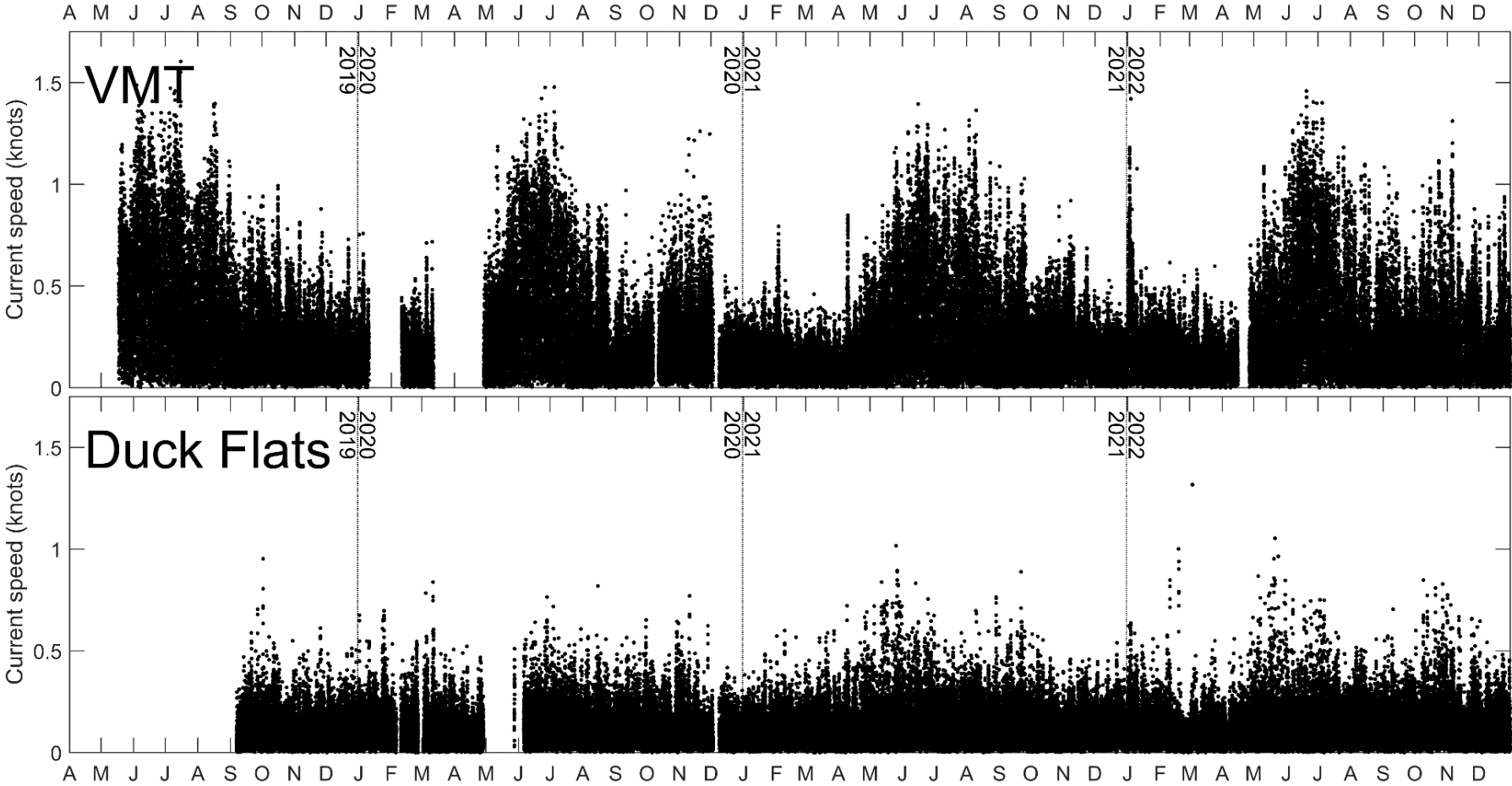


Source: Berkeley Earth database (www.berkeleyearth.org) 1908-2013
VDZA2 1996 - present

Buoy air temperature anomalies 2019-2020

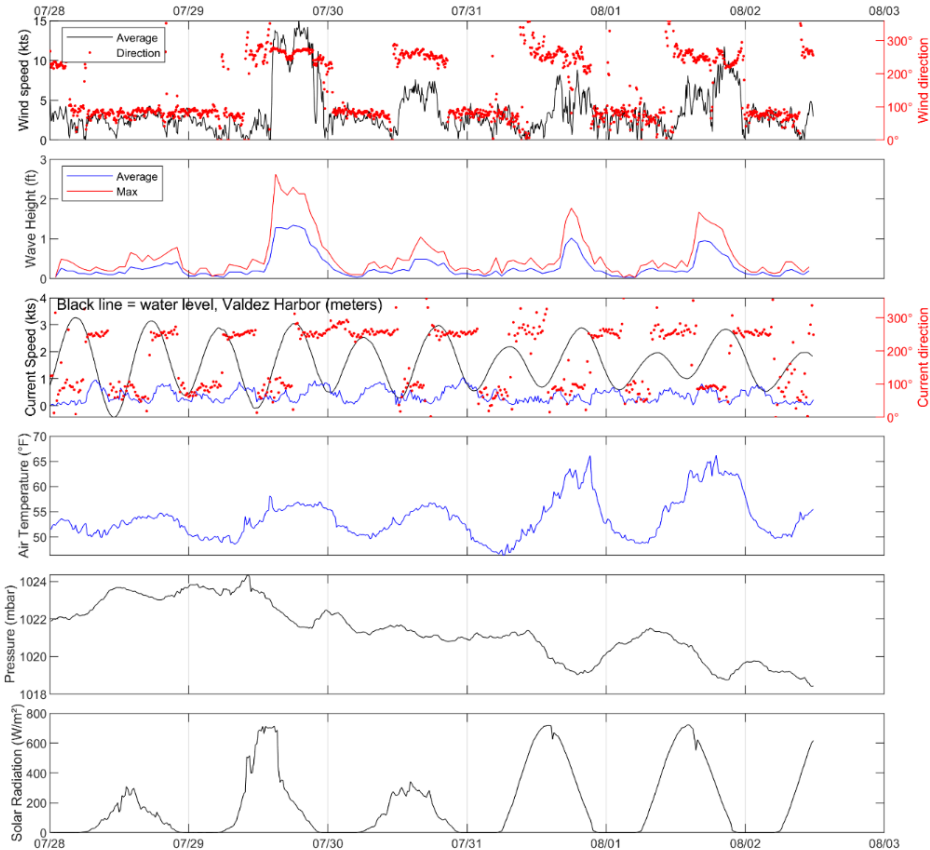


Surface currents

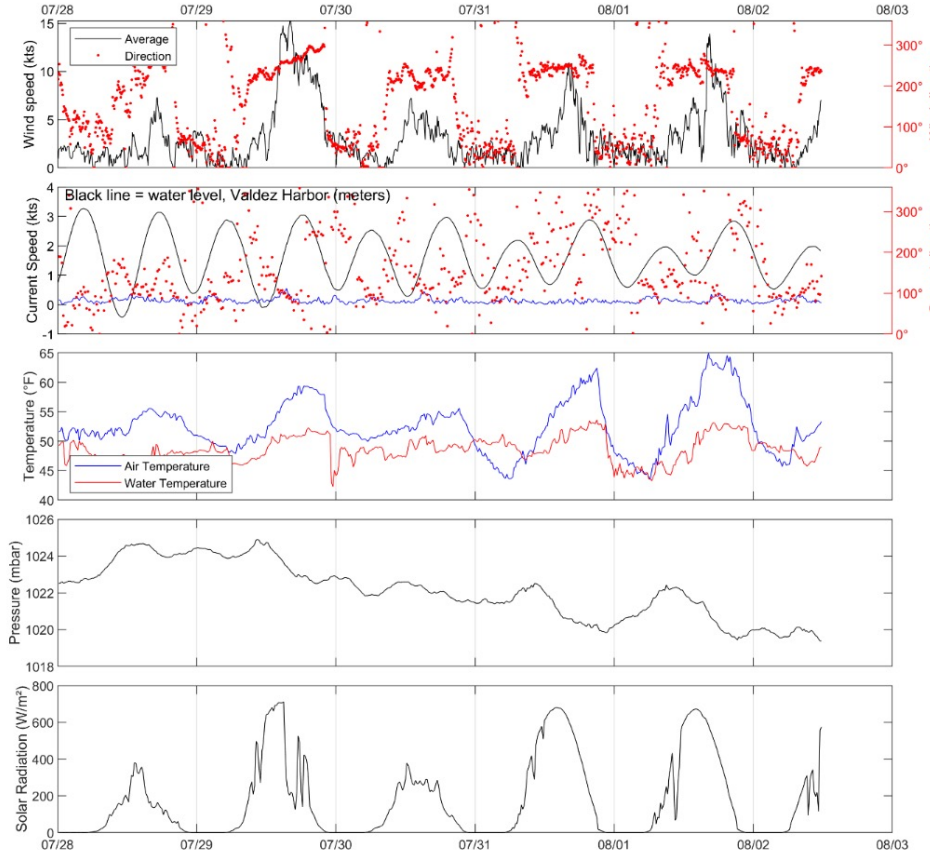


Tidal currents

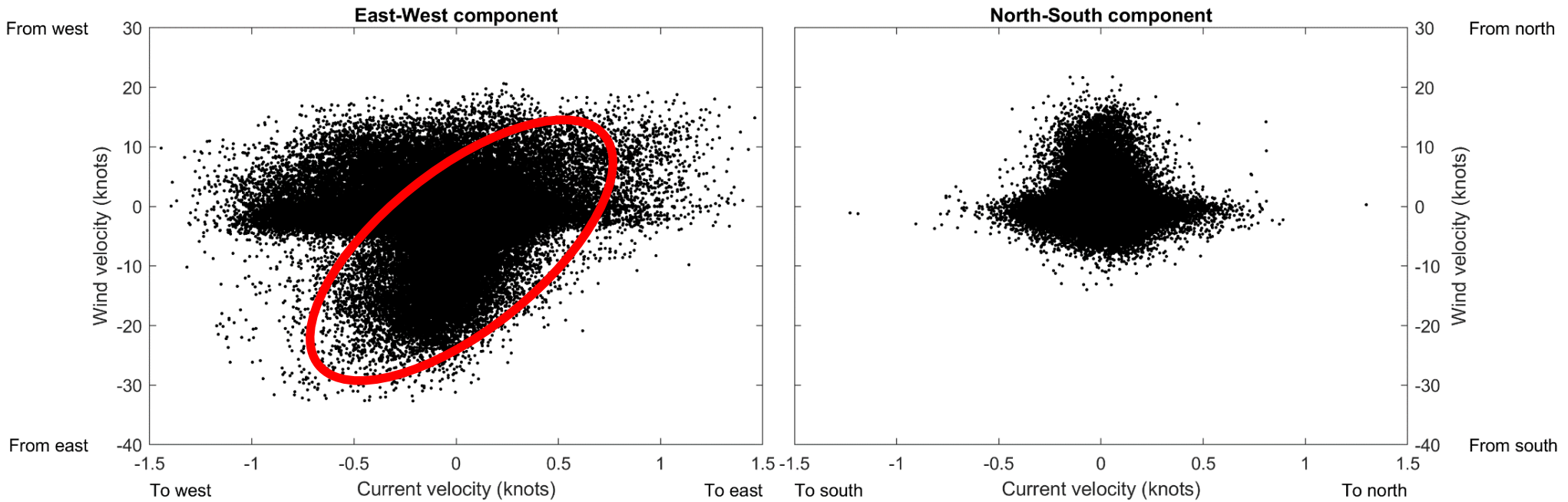
VMT



Duck Flats

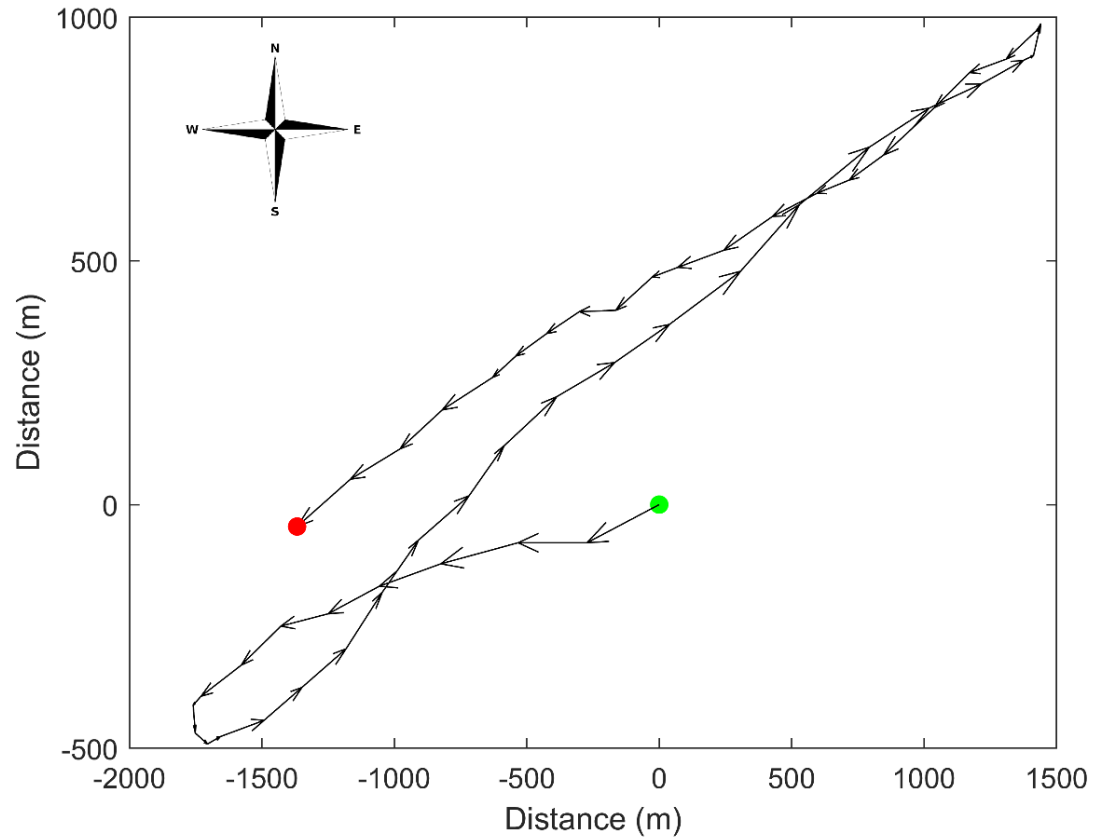


Currents & Wind



*Interpolated into 20 minute time series

Progressive Vector Diagrams

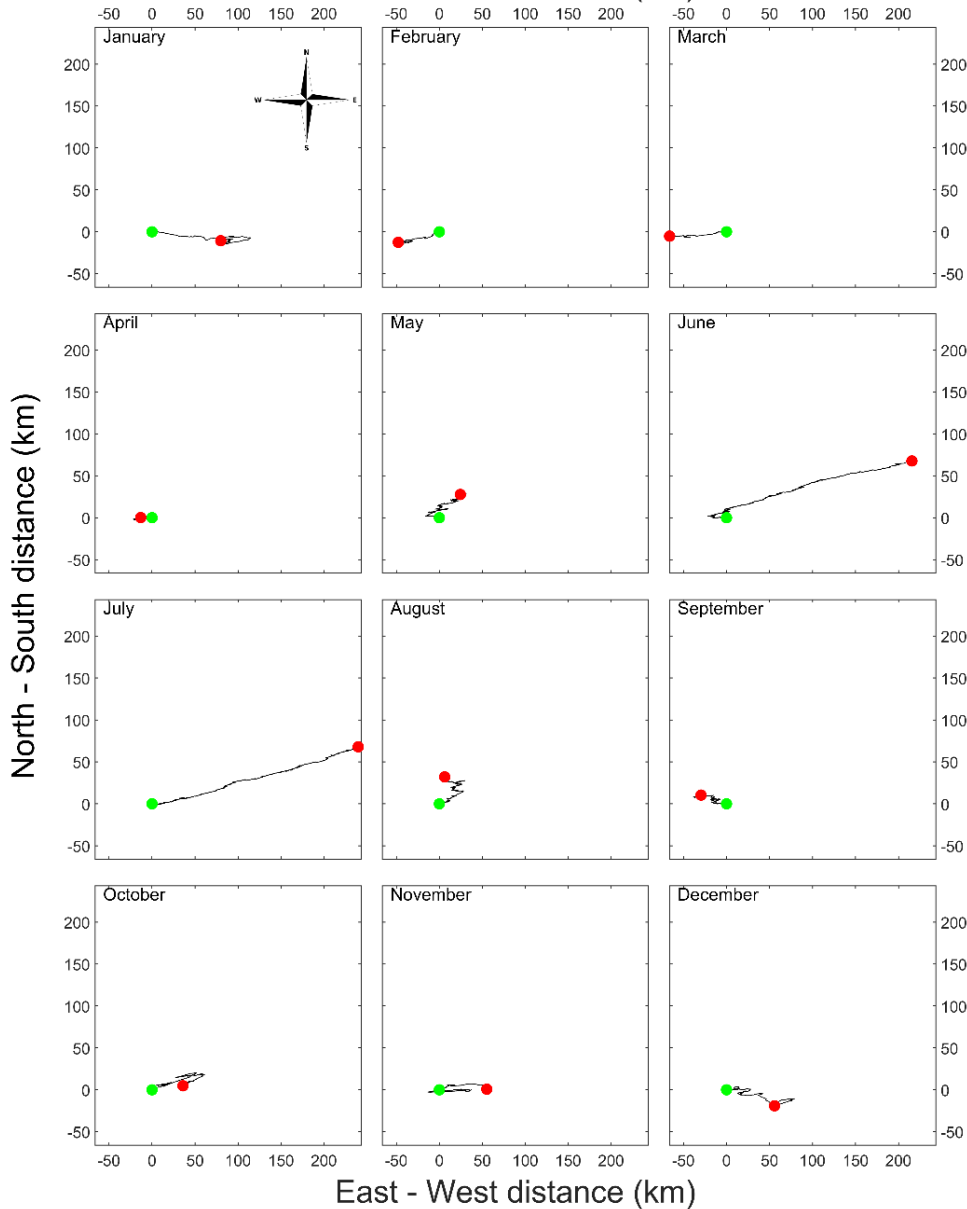


PVDs

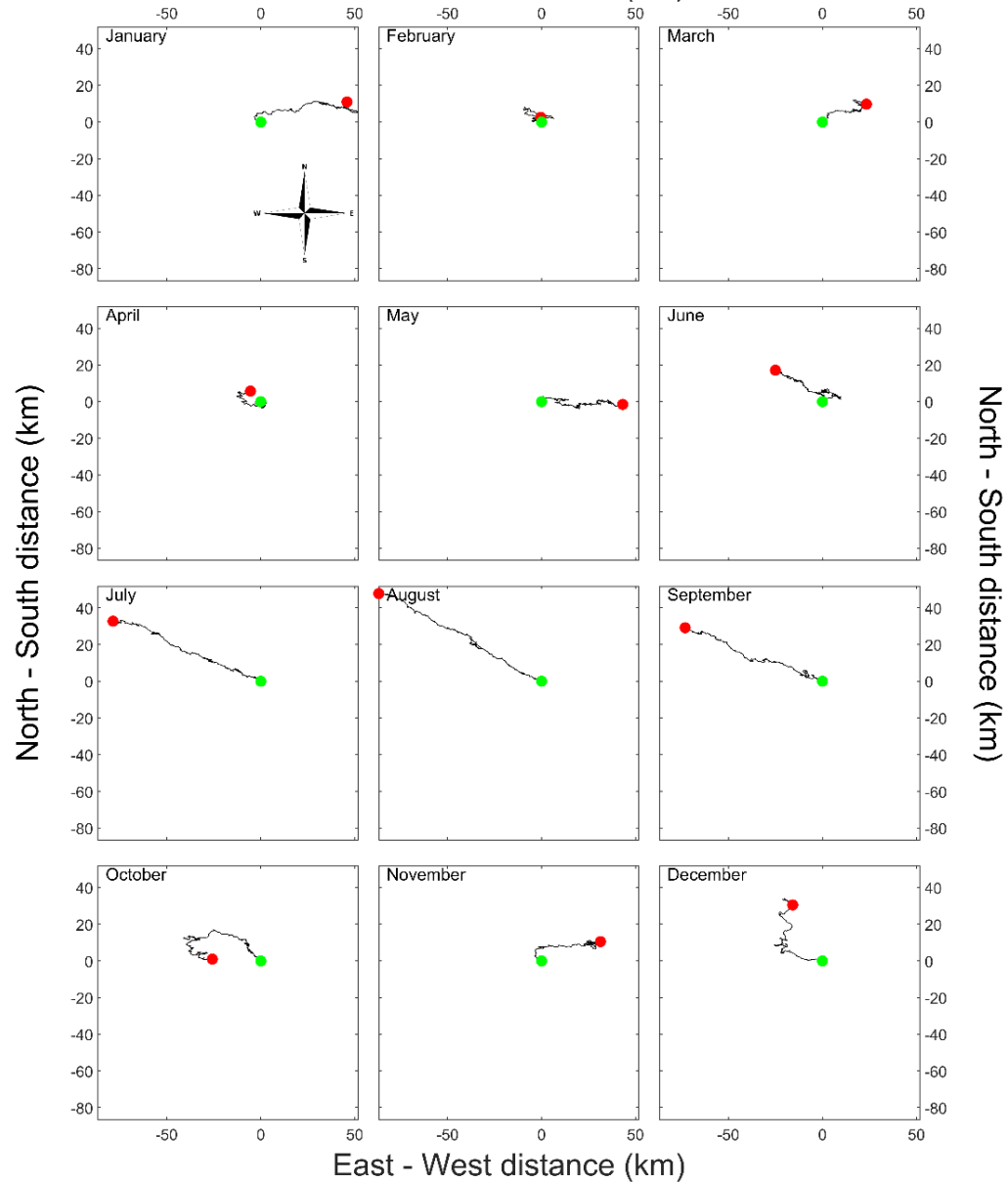
VMT

Duck Flats

East - West distance (km)

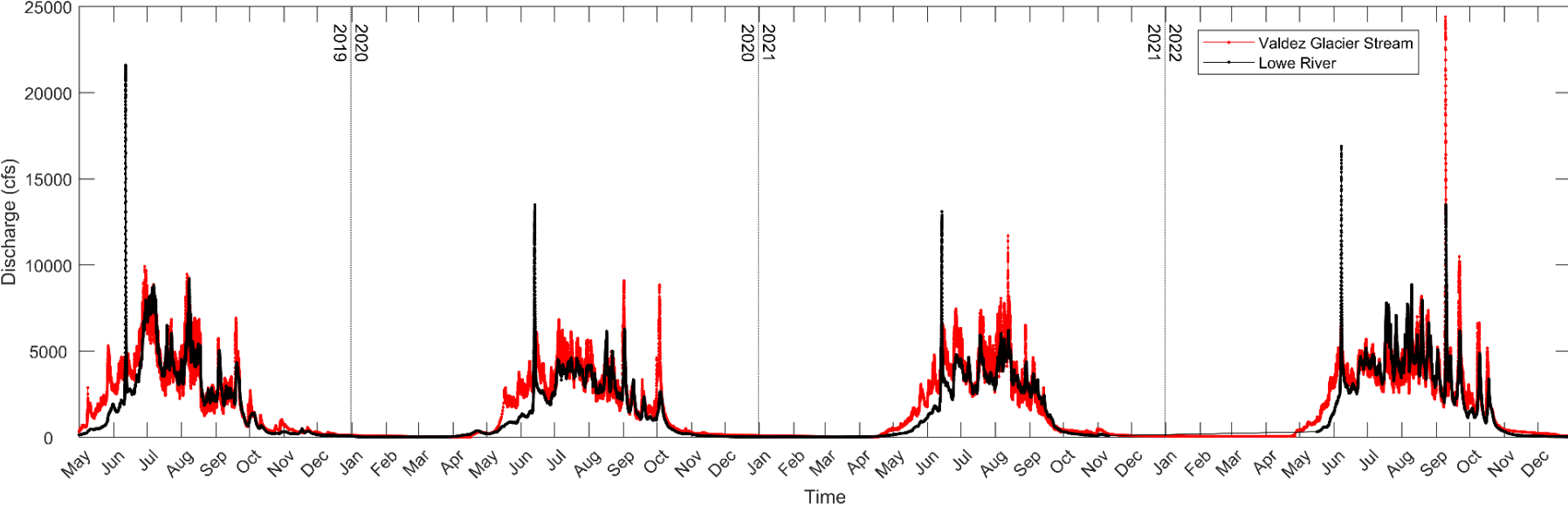


East - West distance (km)



Note: Same axes but different between locations

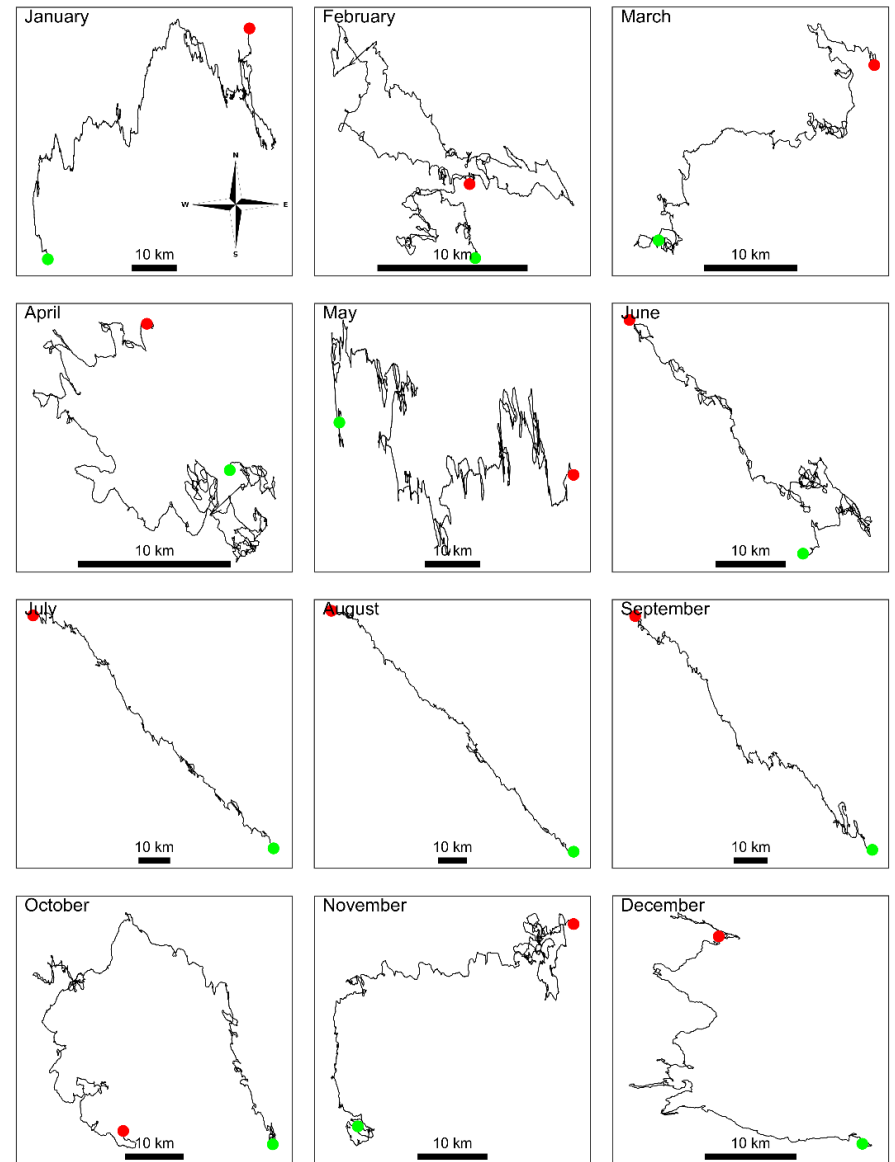
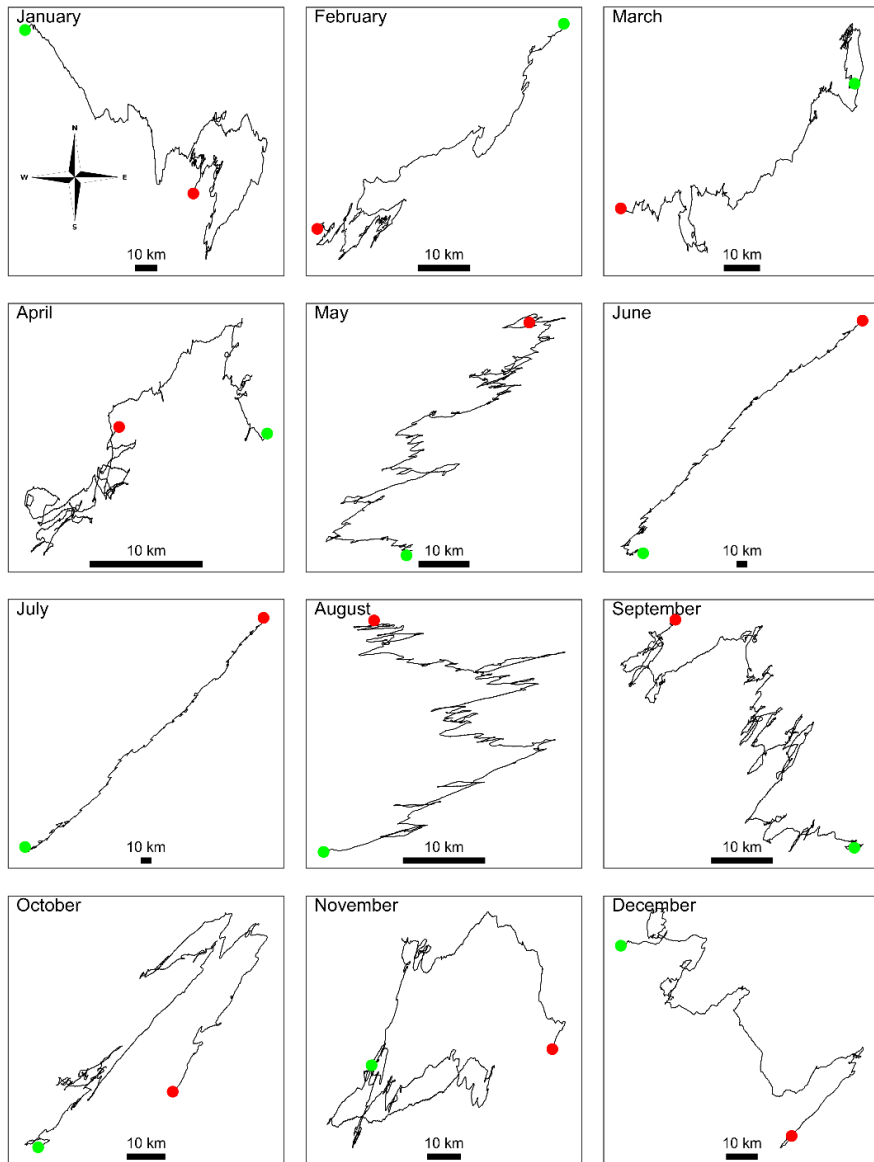
Lowe & Valdez Glacier Stream discharge



PVDs

VMT

Duck Flats



Note: Axes “zoomed” to each month

Conclusions

- Air and water temperatures, and solar radiation followed a seasonal sinusoid with maxima in August and minima in February. Relative humidity was high at both sites and followed the seasonal temperature pattern.
- Air pressure was driven by large-scale atmospheric circulations.
- Winds were mostly from the east in autumn and winter, with maximum gust on order of 25 knots, and transitioned to weak easterly and stronger westerly sea breezes during the summer months.
- Wave directions tended to match wind directions. The highest waves were observed during autumn/winter storms and were of considerable size, just under 9 feet tall; spring/summer sea breeze generated waves were 1-3 feet.
- The temperature climatology persistent warming pattern over the past 114 years. Recently winters have been warmer than average while summers have been cooler than average.
- Surface currents in Port Valdez are complex and result from the interplay of winds, tides, and freshwater inputs. At the VMT, surface currents were northeasterly during summer sea breezes, and were northwesterly at the Duck flats. Tidal oscillations were visible during calmer periods, and surface current directions were variable during autumn and winter.

Thanks!

