*Supplement of*

# Contrasting sea ice drift and deformation between winter and spring in the Antarctic marginal ice zone

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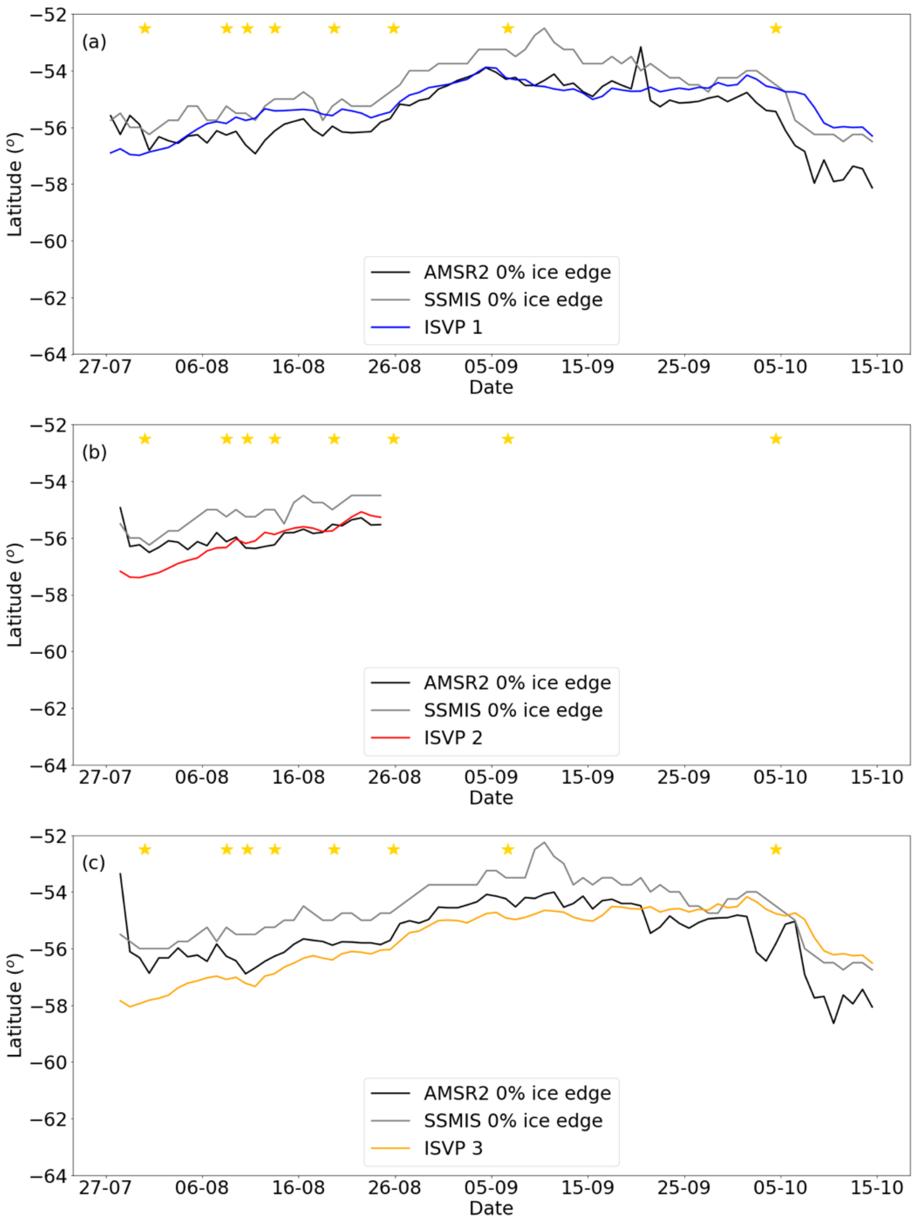


**Figure S1:** (a) Latitudinal location of ISVP 1 and the sea ice edge, defined as the > 0 % sea ice concentration contour, along the same longitude, for each day of the buoys' trajectories. The black line denotes the latitude of the AMSR2 ice edge. The grey line is from the SSMIS sea ice product. (b) Same as in (a) but for ISVP 2. (c) Same as in (a) but for ISVP 3. The gold star symbols indicate the time when the winter cyclones were closest to the buoys' location.

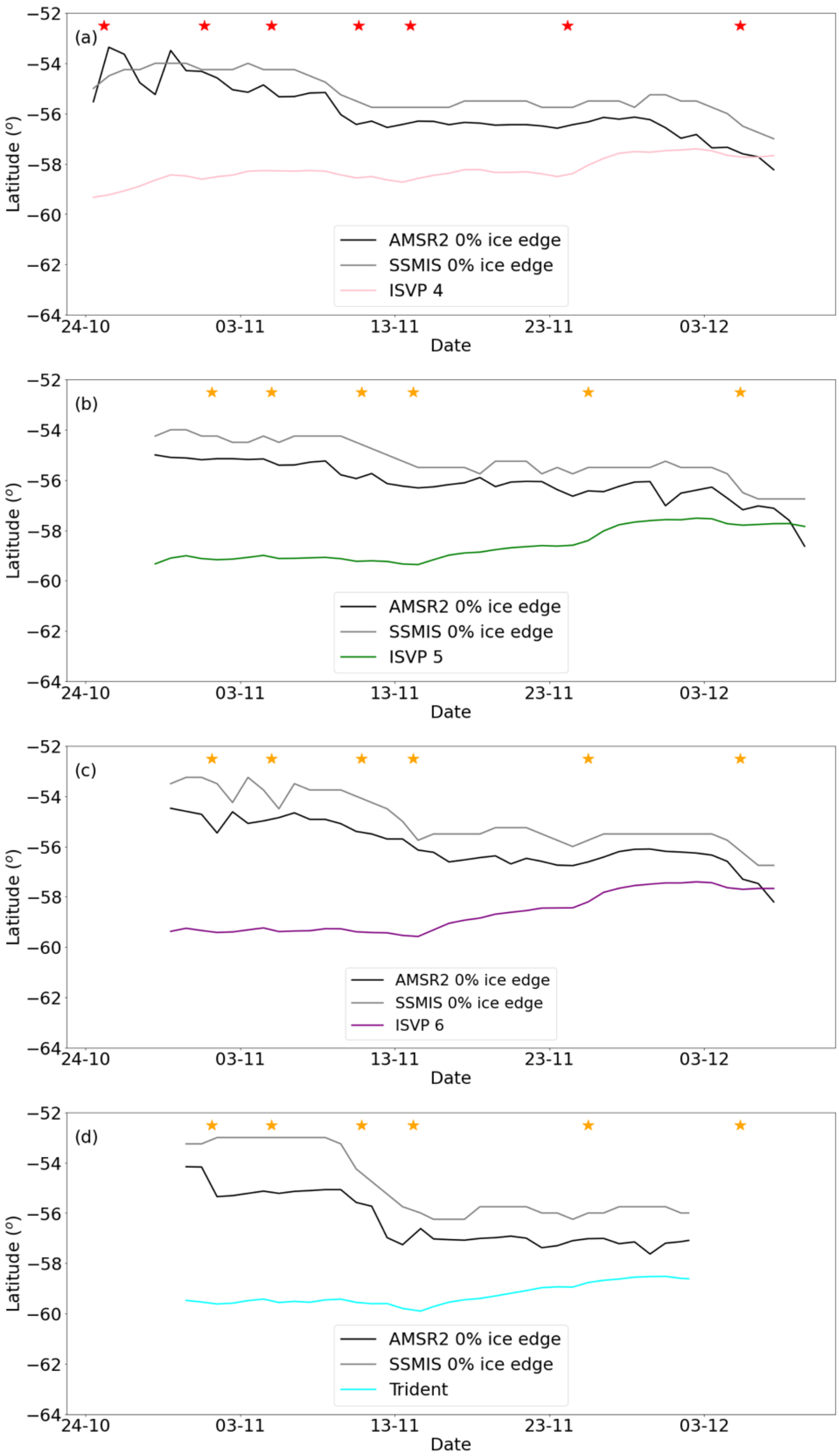


**Figure S2:** (a) Latitudinal location of ISVP 4 and the sea ice edge, defined as the > 0 % sea ice concentration contour, along the same longitude, for each day of the buoys' trajectories. The black line denotes the latitude of the AMSR2 ice edge. The grey line is from the SSMIS sea ice product. (b) Same as in (a) but for ISVP 5. (c) Same as in (a) but for ISVP 6. (d) Same as in (a) but for the Trident. The red stars denote when the spring cyclones were closest to ISVP 4. The orange stars denote when the same spring cyclones were closest to the main spring cluster ≈ 5$^{o}$ east of ISVP 4.

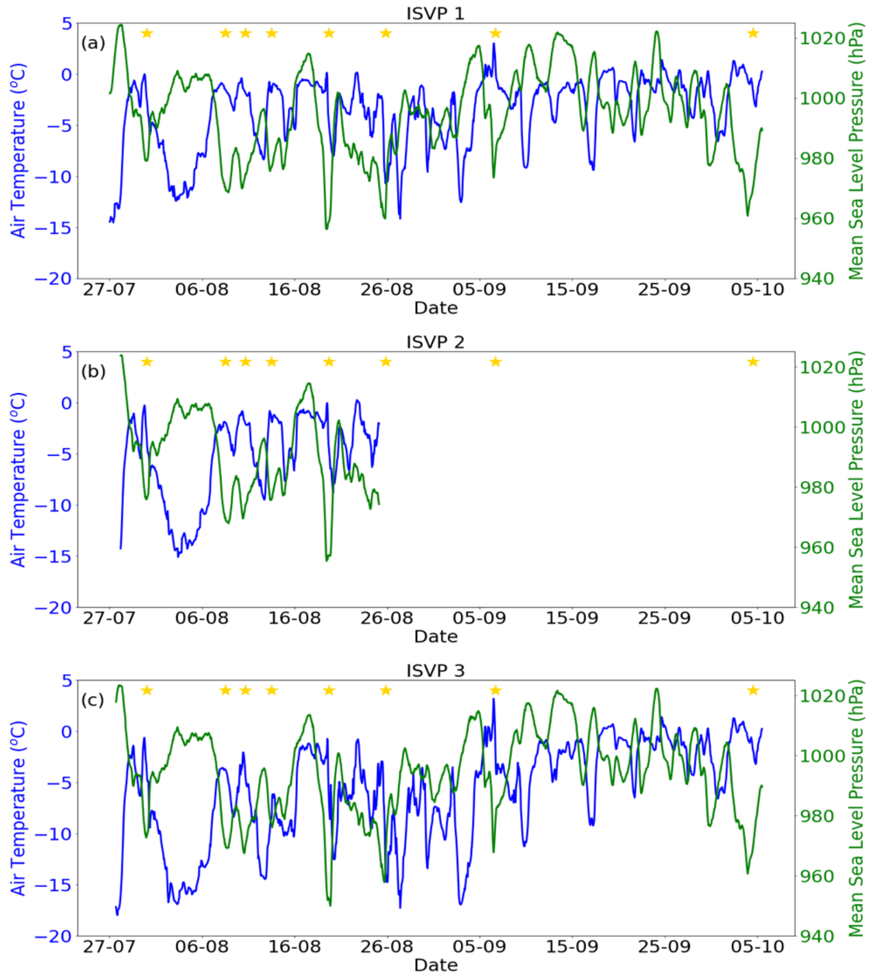


**Figure S3:** (a) Time series of the ERA5 2 m air temperature (blue) and mean sea level pressure (green) at the location of ISVP 1, during winter. (b) Same as in (a) but for ISVP 2. (c) Same as in (a) but for ISVP 3. The gold stars denote when the cyclones were closest to the Winter buoys' location.

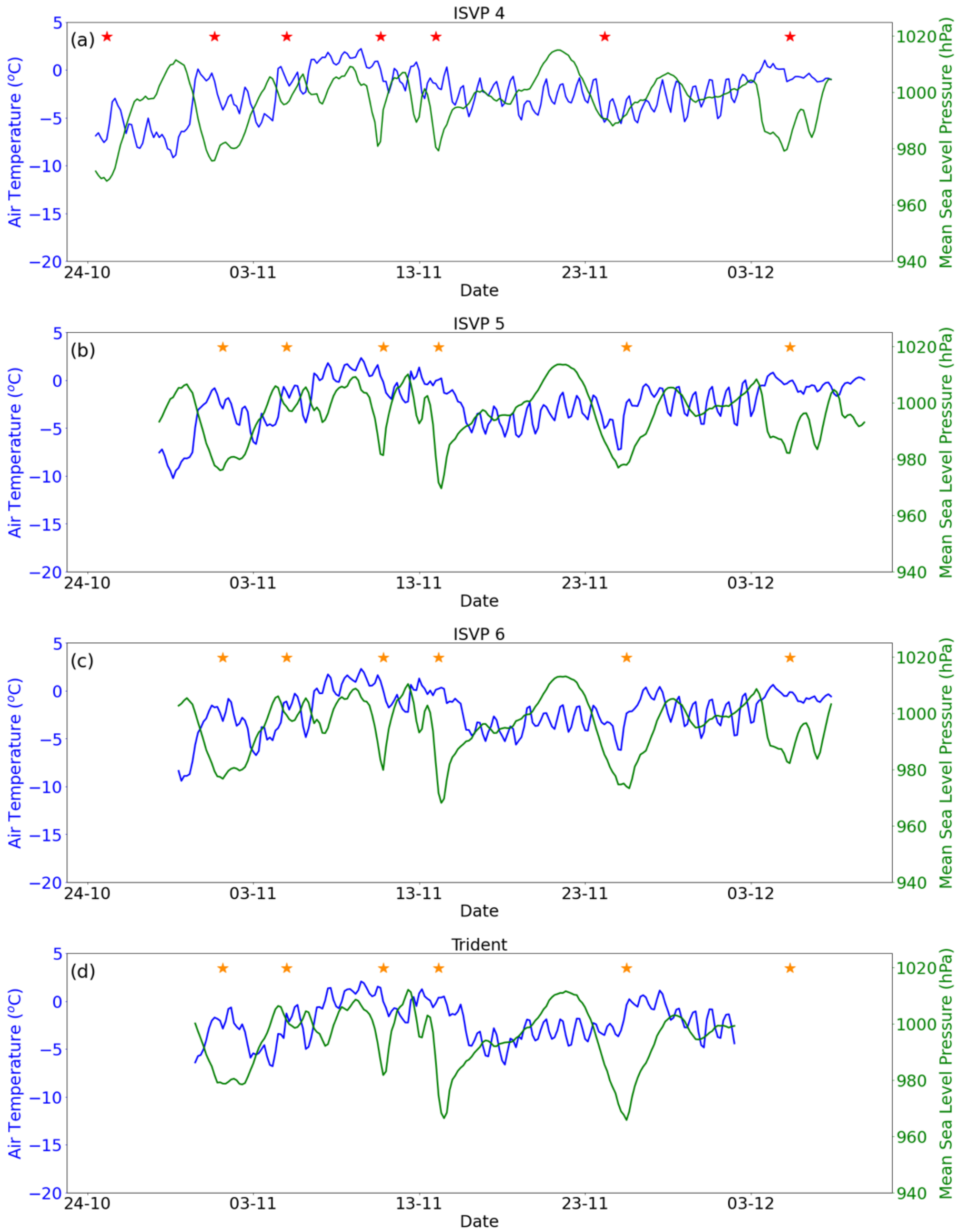


**Figure S4:** (a) Time series of the ERA5 2 m temperature (blue) and mean sea level pressure (green) at the location of ISVP 4, during spring. (b) Same as in (a)but for ISVP 5. (c) Same as in (a) but for ISVP 6. (d) Same as in (a) but for the Trident. The red stars denote when the cyclones were closest to the eastwards main cluster. The orange stars denote when the same cyclones were closest to ISVP 4 as it was deployed ≈ 5° west of the main spring cluster.

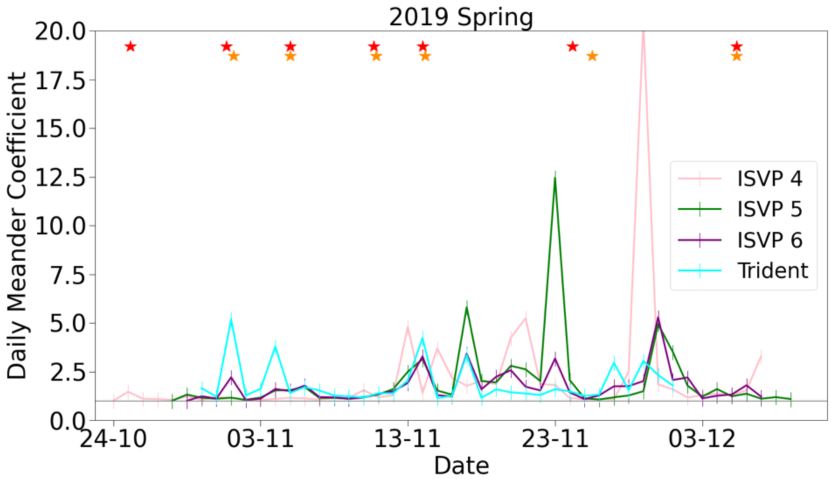


**Figure S5:** Time series of the daily discrete meander coefficient computed using the Trident's four-hourly time step for all Spring buoys. The vertical markers are indicative of the daily time interval and the horizontal grey line at M=1 denotes straight-line drift. The red stars denote when the spring cyclones were closest to ISVP 4. The orange stars denote when the same spring cyclones were closest to the main spring cluster, ≈ 5° east of ISVP 4.

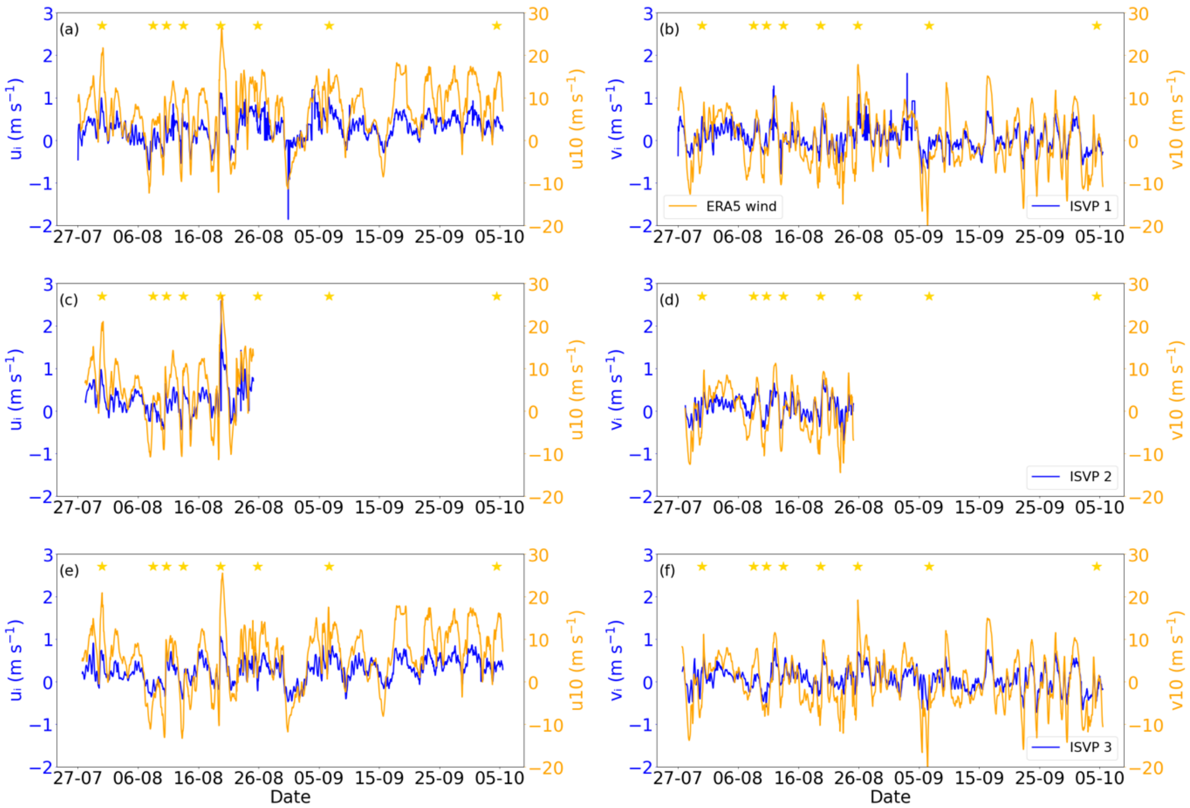


**Figure S6:** Velocity components of the Winter buoys (on the left axis) and 10 m wind from the ERA5 reanalyses (on the right axis): the zonal and meridional component of ISVP 1 (a-b), ISVP 2 (c-d), and of ISVP 3 (e-f). The gold stars denote when the winter cyclones were closest to the Winter buoys' location.

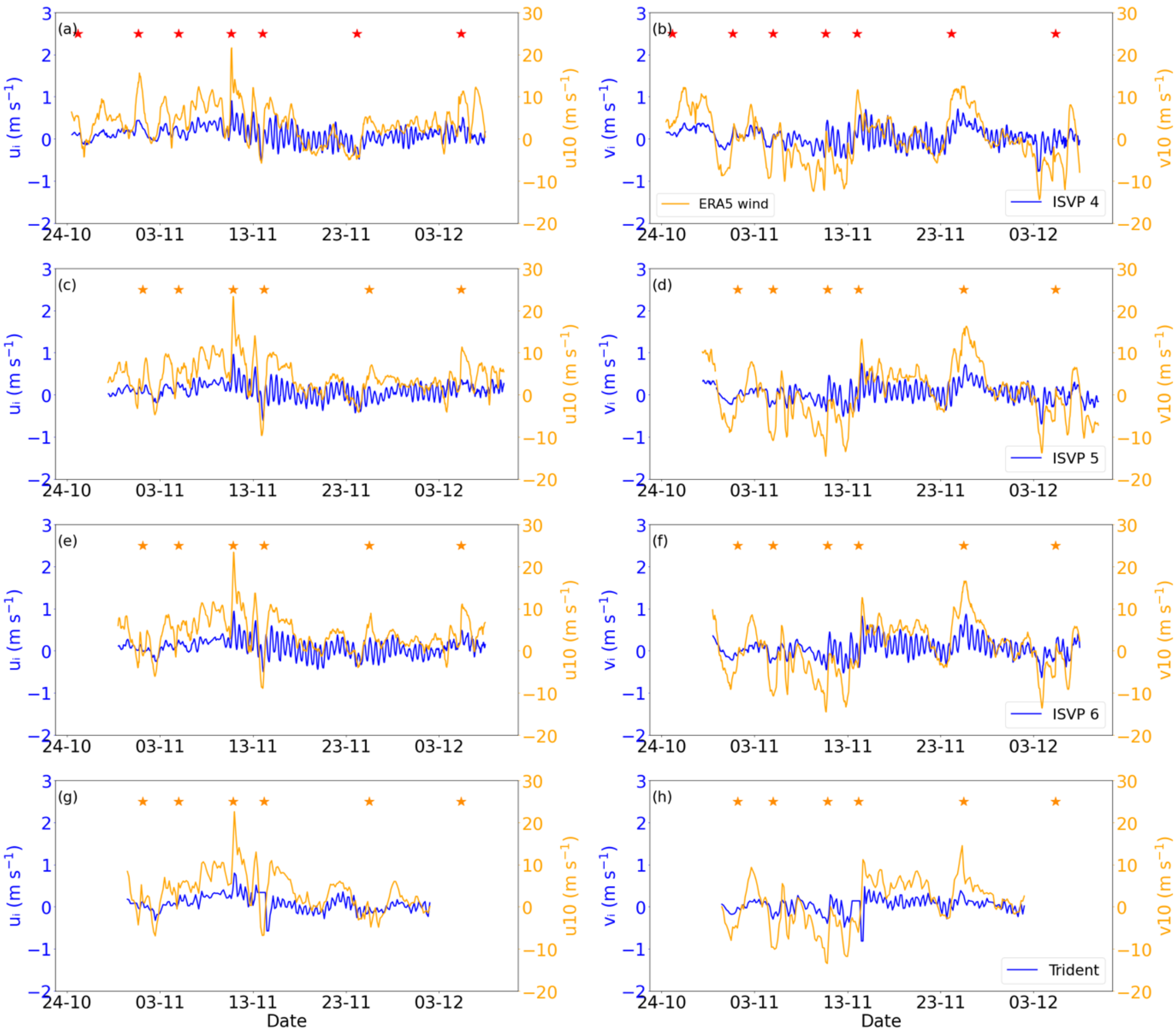


**Figure S7:** Velocity components of the Spring buoys (on the left axis) and 10 m wind from the ERA5 reanalyses (on the right axis): the zonal and meridional component of ISVP 4 (a-b), ISVP 5 (c-d), ISVP 6 (e-f), and of the Trident (g-h). The red stars denote when the spring cyclones were closest to ISVP 4. The orange stars denote when the same spring cyclones were closest to the main spring cluster ≈ 5° east of ISVP 4.

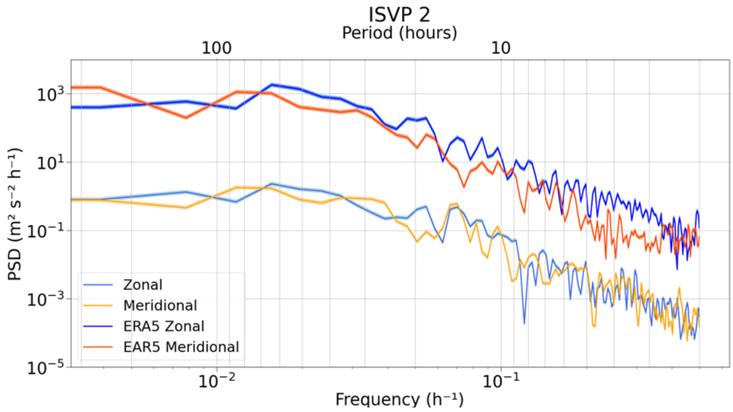


**Figure S8:** Power spectral density corresponding to the zonal and meridional components of ISVP 2, in winter, and its corresponding ERA5 wind velocity.

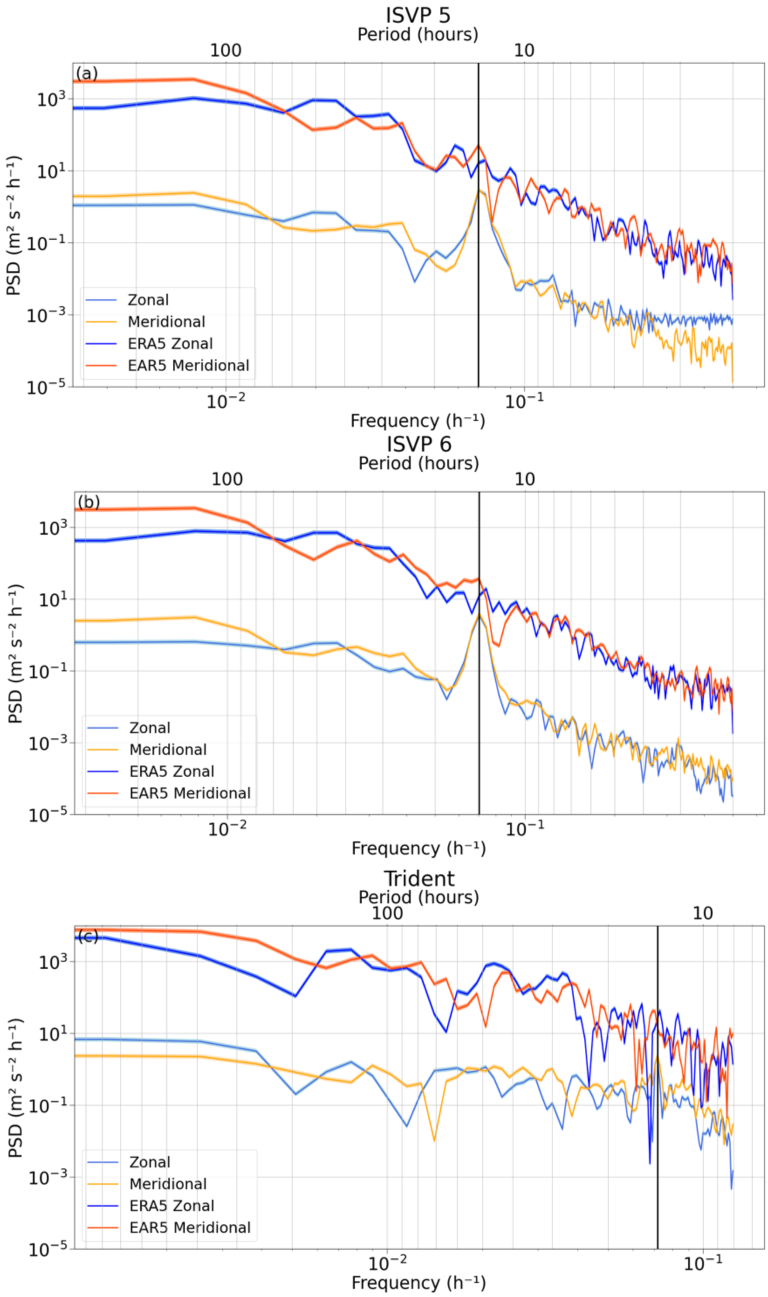


**Figure S9:** Power spectral density corresponding to the zonal and meridional components of (a) ISVP 5, in spring, and its corresponding ERA5 wind velocity. (b) Same as in (a) but for ISVP 6. (c) Same as in (a) but for the Trident. The black vertical line indicates the peak associated with inertial oscillations at 14.22 hours for both ISVPs and 13.92 hours for the Trident.

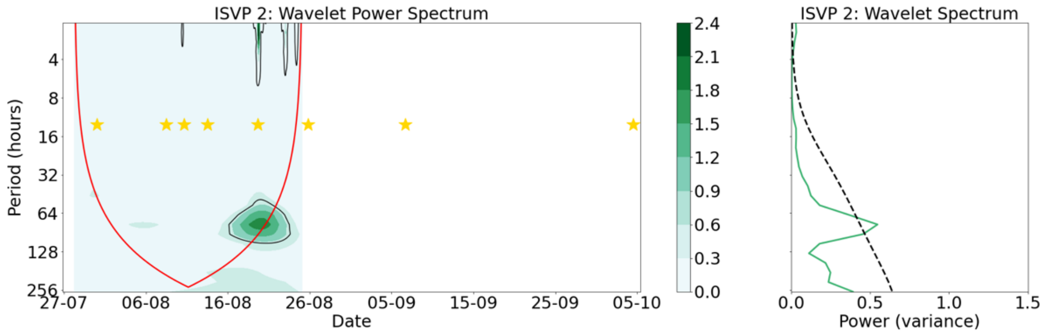


**Figure S10:** The wavelet power spetrum with time (left panel) and wavelet spectrum (right panel) of the filtered velocity magnitude spectrum of ISVP 2, during winter. The red line indicates the cone of influence (left panel), the black contours (left panel) and black dashed lines (right panel) indicate the 95 % significance level. The gold stars denote when the cyclones were closest to the Winter buoys' location, and are found at the theorectical inertial frequency, defined by the Coriolis paramter.

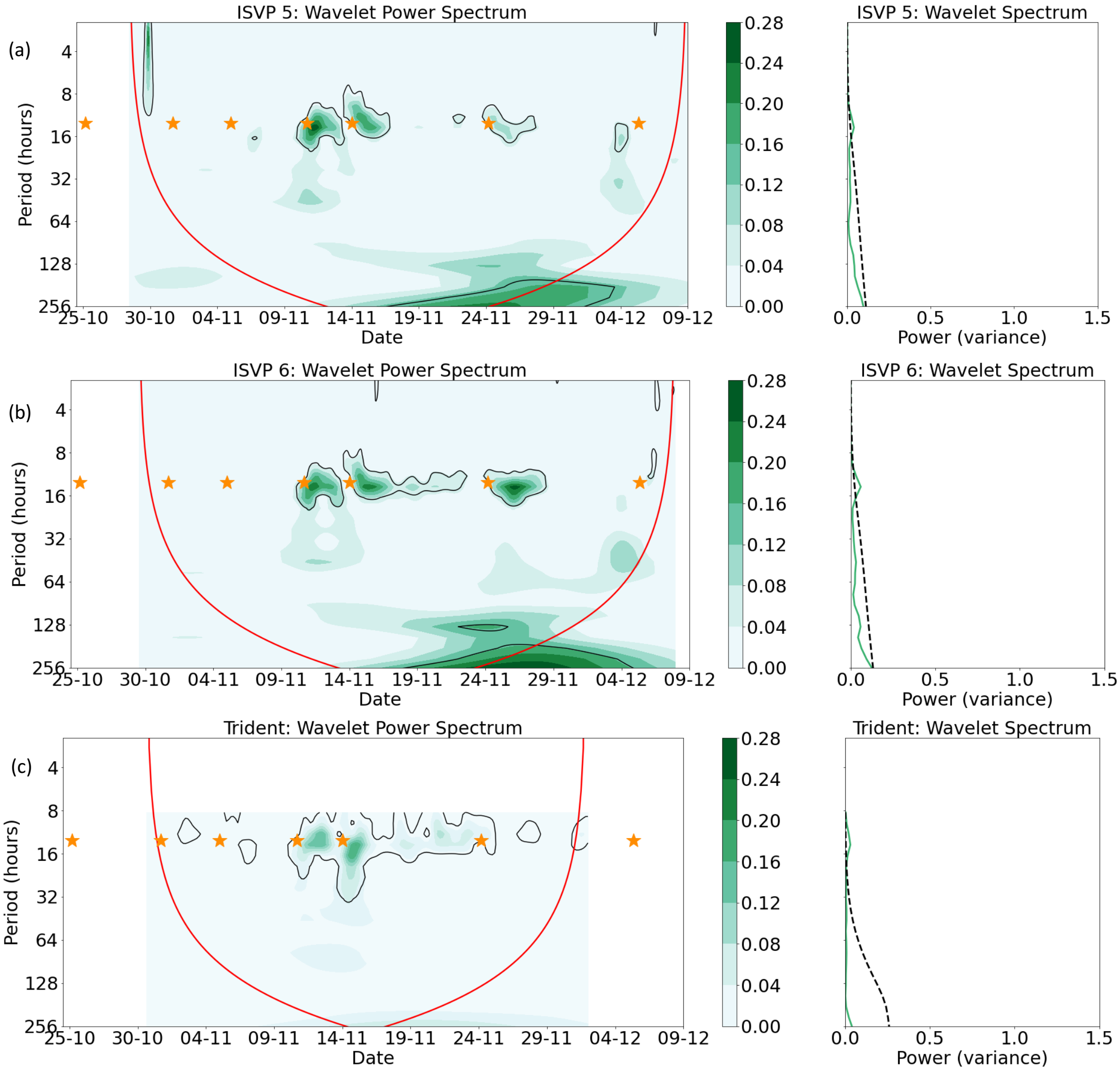


**Figure S11:** (a) The wavelet power spectrum with time (left panel) and wavelet spectrum (right panel) of the filtered velocity magnitude spectrum of ISVP 5, during spring. (b) Same as (a) but for ISVP 6. (c) Same as (a) but for the Trident buoy. The red line indicates the cone of influence (left panel), the black contours (left panel) and black dashed lines (right panel) indicate the 95 % significance level. The orange stars denote when the same spring cyclones were closest to the main spring cluster ≈ 5$^{o}$ east of ISVP 4, and are found at the theoretical inertial frequency, determined by the Coriolis parameter.

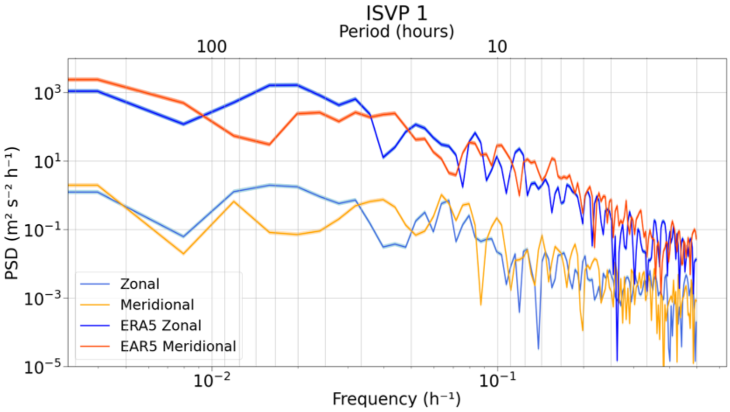


**Figure S12:** Power spectral density corresponding to the first 10 days of the zonal and meridional components of ISVP 1, in winter, and its corresponding ERA5 wind velocity. The lighter shadings indicate to the 95 % confidence interval for each corresponding ice and wind velocity component.