

# Mono atlas analysis

February 25, 2021

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## 2 Global observations of nonlinear mesoscale eddies

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The following figures are adaptated from Chelton, D. B., Schlax, M. G., Samelson, R. M. and de Szoeke, R. A.: Global observations of large oceanic eddies, *Geophys. Res. Lett.*, 34(15), L15606, <https://doi.org/10.1016/j.pocean.2011.01.002>

Load dataset

Loading with contours (large memory use)

General properties

Definitions

### 2.1 Period of the described Atlas

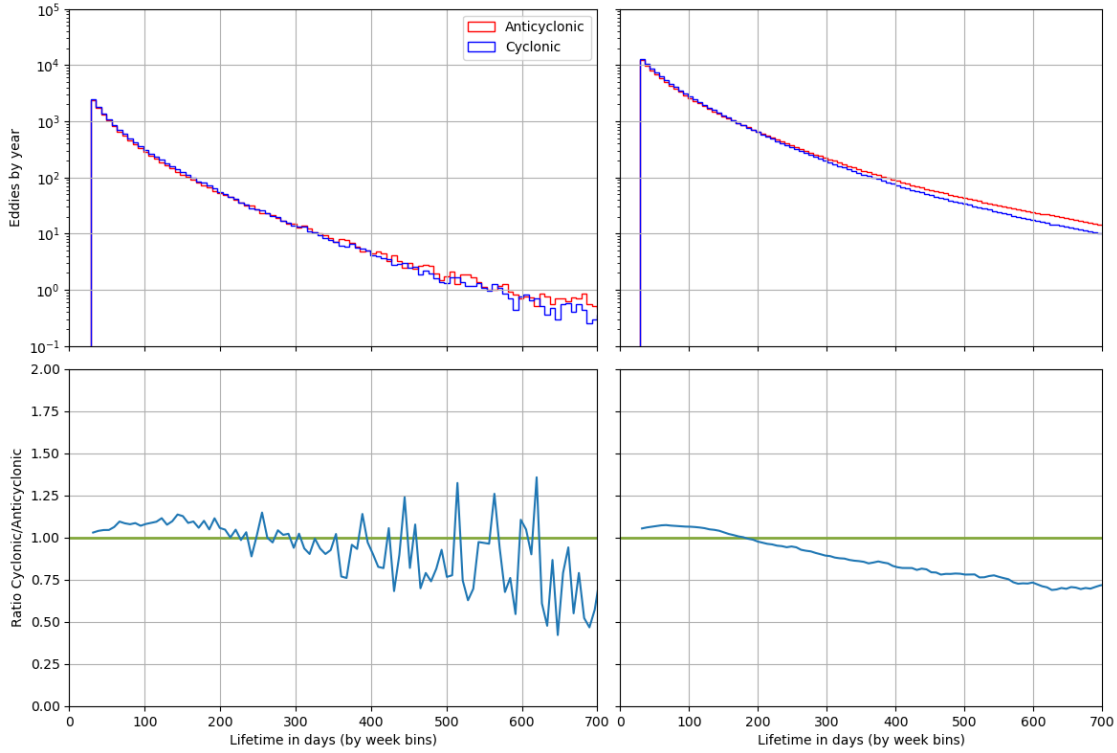
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The following figures are displayed on period January 1993 - March 2020

## 2.2 Figure 2 - Lifetime

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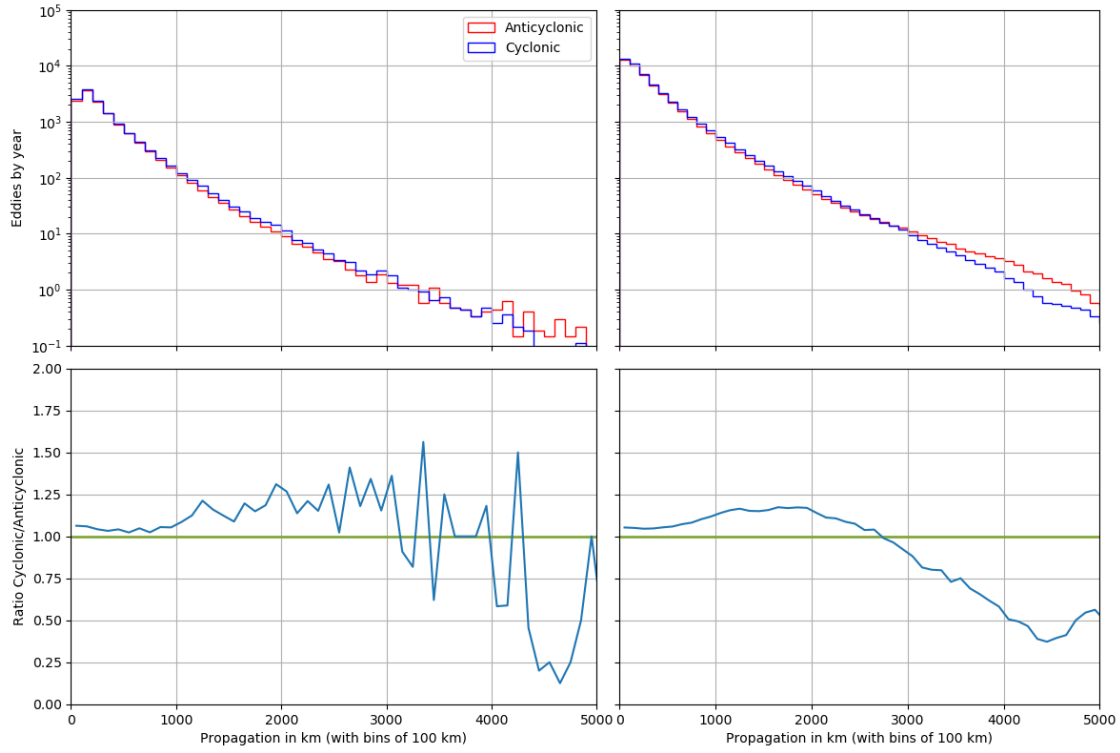
Histograms (left) and upper-tail cumulative histograms (right) of the lifetimes of the cyclonic (blue lines) and anticyclonic (red lines) eddies. The ratios of the histogram values are shown in the bottom left panel and in the bottom right panel with a 21-week running average.



## 2.3 Figure 3 - Propagation

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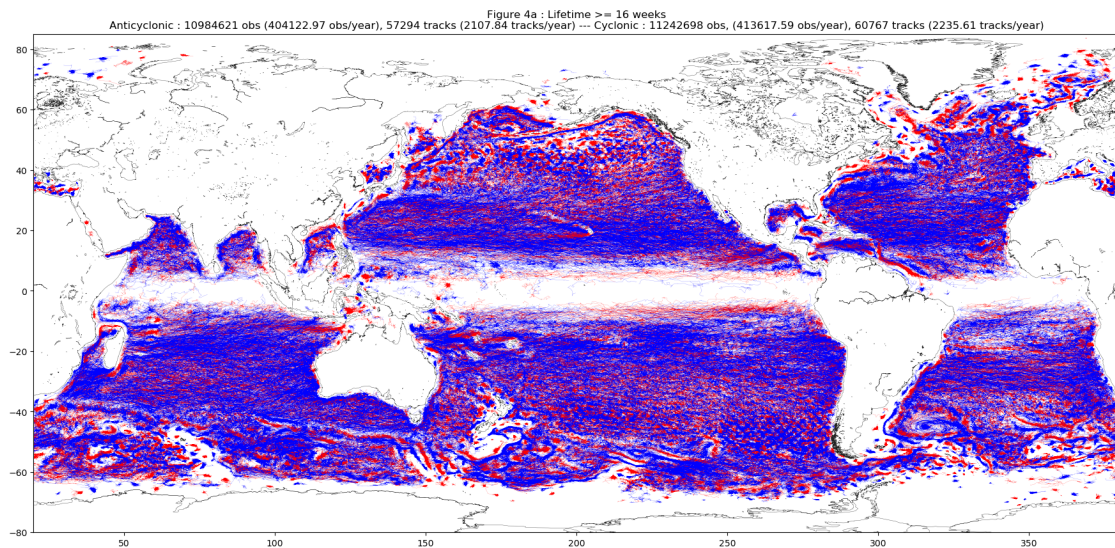
Histograms (left) and upper-tail cumulative histograms (right) of the great-circle propagation distances of cyclonic (blue) and anticyclonic (red) eddies with lifetimes  $\geq 16$  weeks. The ratios of the histogram values are shown in the bottom left panel and in the bottom right panel with a 500-km running average.

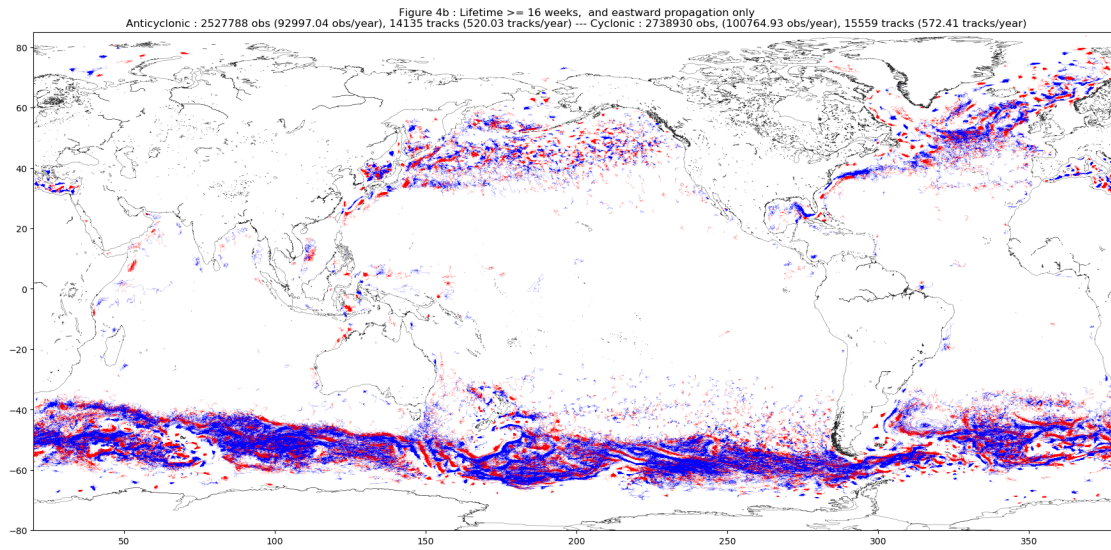


## 2.4 Figure 4 - Long trajectories

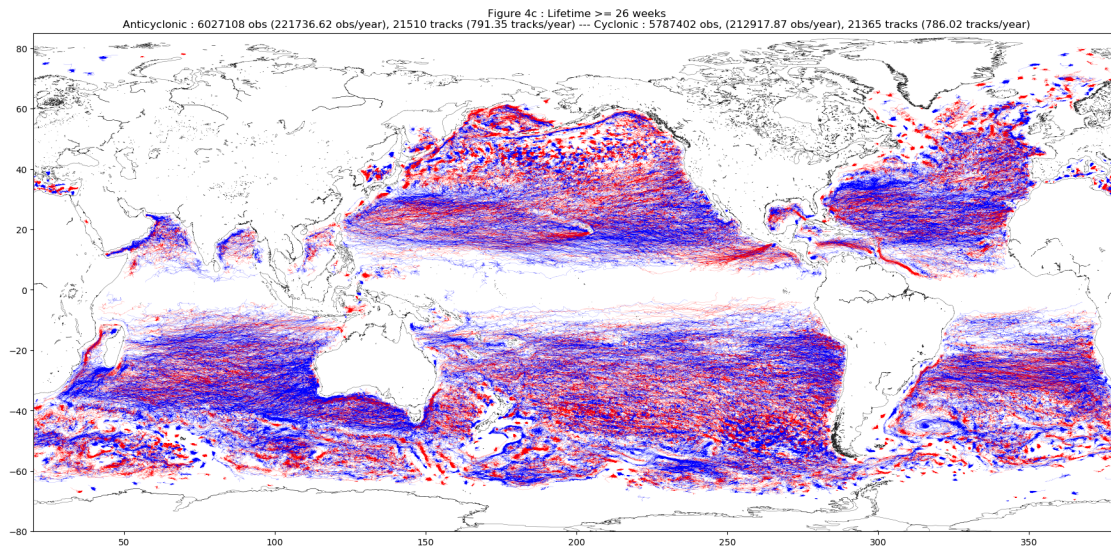
top

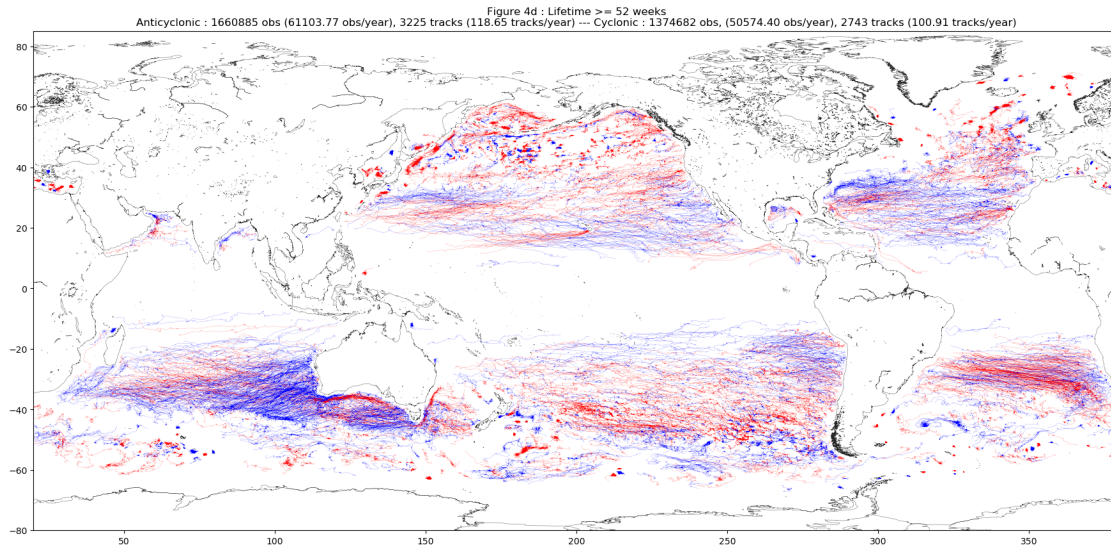
a and b. The trajectories of cyclonic (blue lines) and anticyclonic (red lines) eddies for (a) lifetimes  $\geq 16$  weeks and (b) lifetimes  $\geq 16$  weeks for only those eddies for which the net displacement was eastward. The numbers of eddies of each polarity are labeled at the top of each panel.



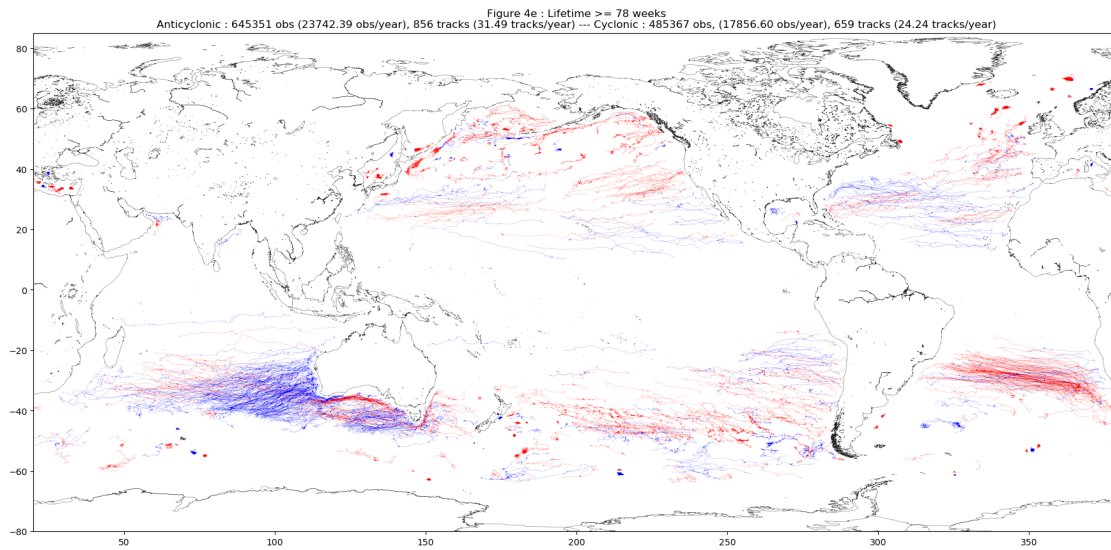


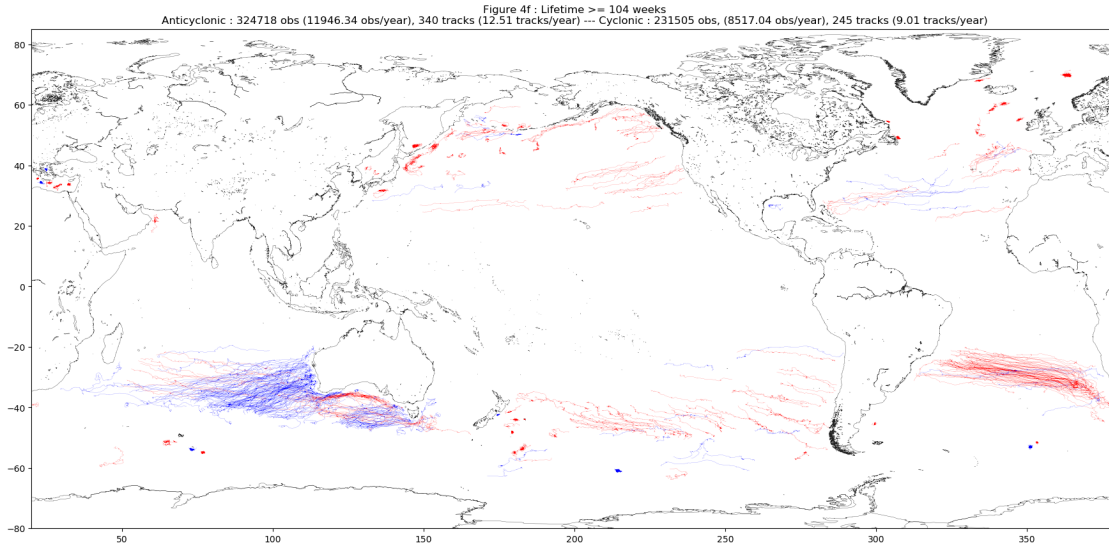
4c and d. The same as Fig. 4a, except: (c) lifetimes  $\geq 26$  weeks and (d) lifetimes  $\geq 52$  weeks.





4e and f. The same as Fig. 4a, except: (e) lifetimes  $\geq 78$  weeks and (f) lifetimes  $\geq 104$  weeks.

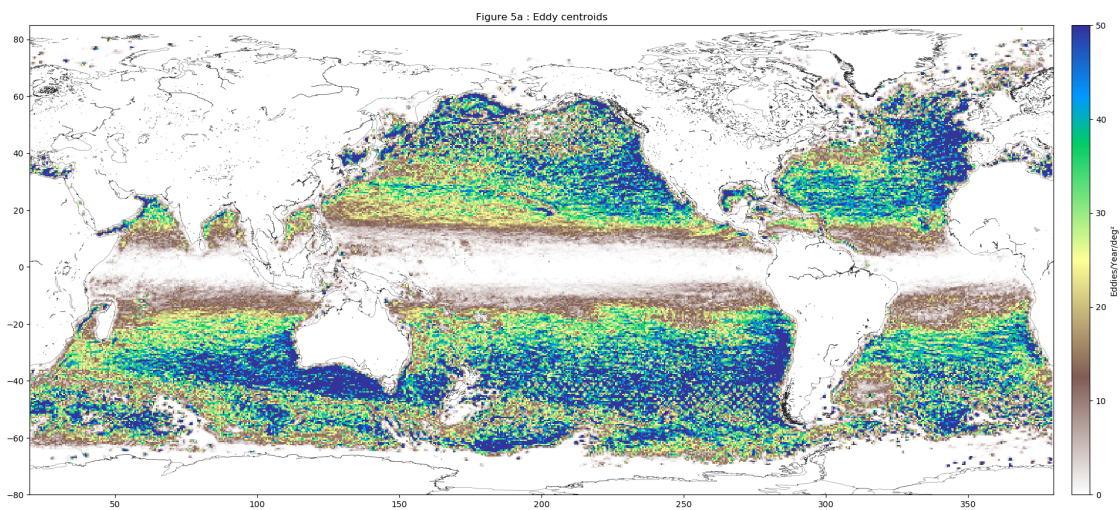


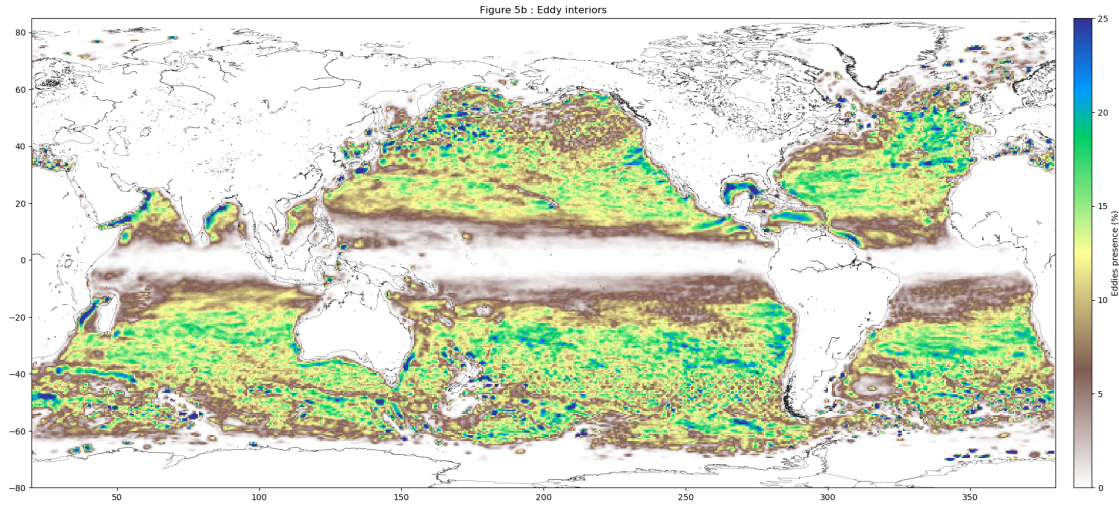


## 2.5 Figure 5 - Census

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Census statistics for the numbers of eddy centroids (a) and eddy interiors (b) for eddies with lifetimes  $\geq 16$  weeks that passed through each  $1 \times 1$  region. The eddy interiors are defined by the contour of SSH around which the average geostrophic speed is maximum (corresponding approximately to a contour of zero relative vorticity).

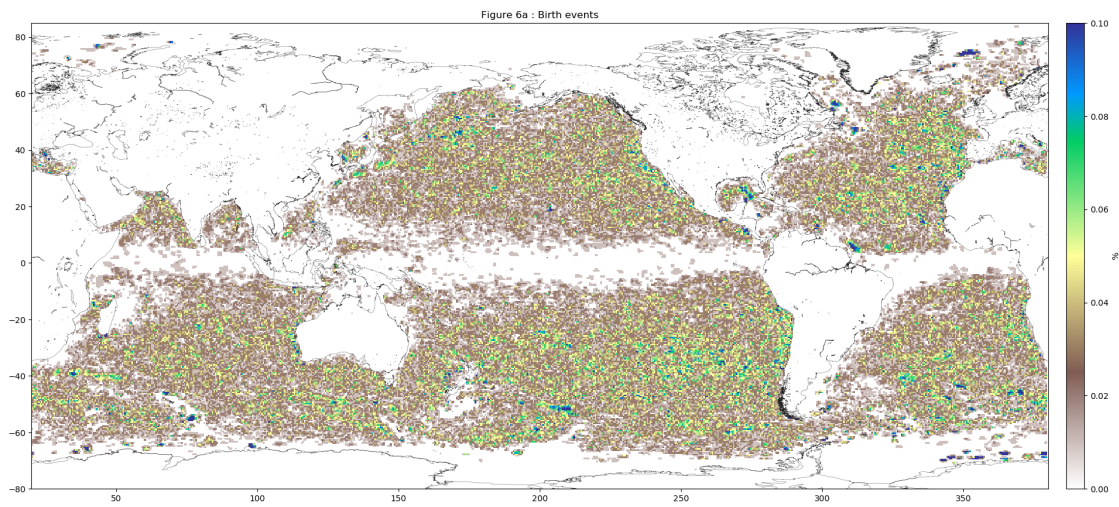


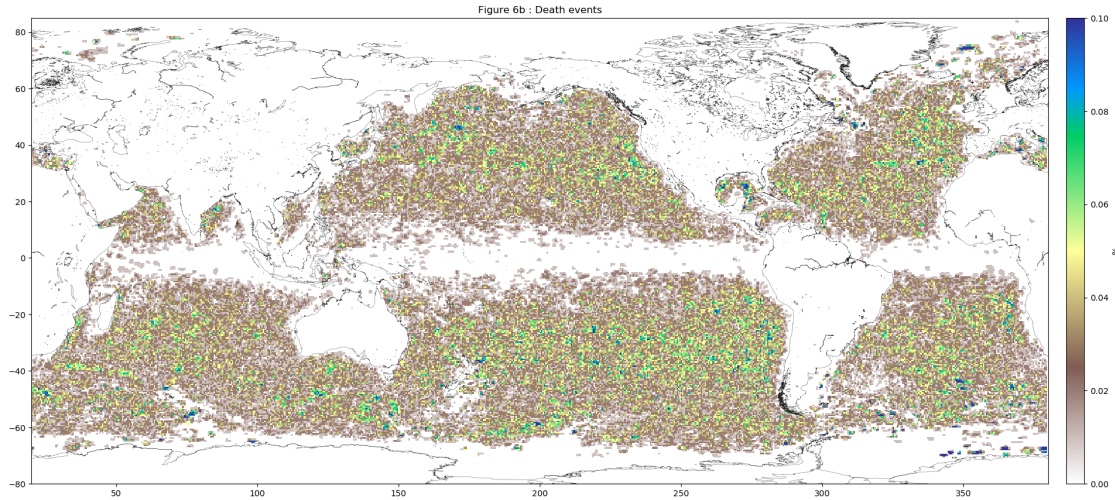


## 2.6 Figure 6 - Birth and death

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Census statistics for eddies with lifetimes  $\geq 16$  weeks showing the percentage of (a) eddy origins and (b) eddy terminations for each  $1 \times 1$  region.

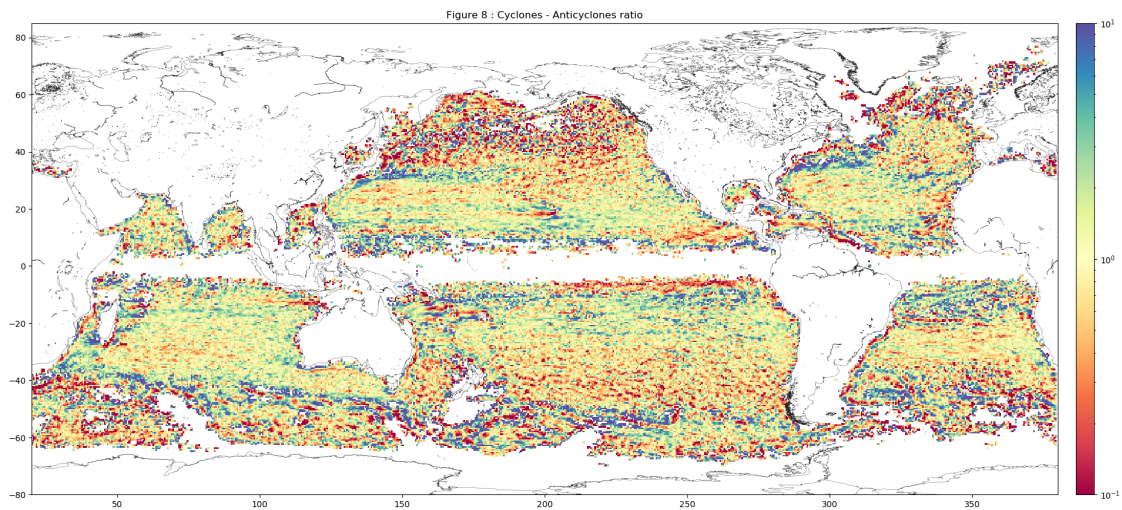




## 2.7 Figure 8 - Ratio cyclones/anticyclones

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The ratio of the numbers of cyclonic to anticyclonic eddy centers for eddies with lifetimes  $\geq 16$  weeks that propagated through each  $1 \times 1$  region. A logarithmic scale is used for the color bar in order to give equal emphasis to the ratios  $r$  and  $1/r$ .



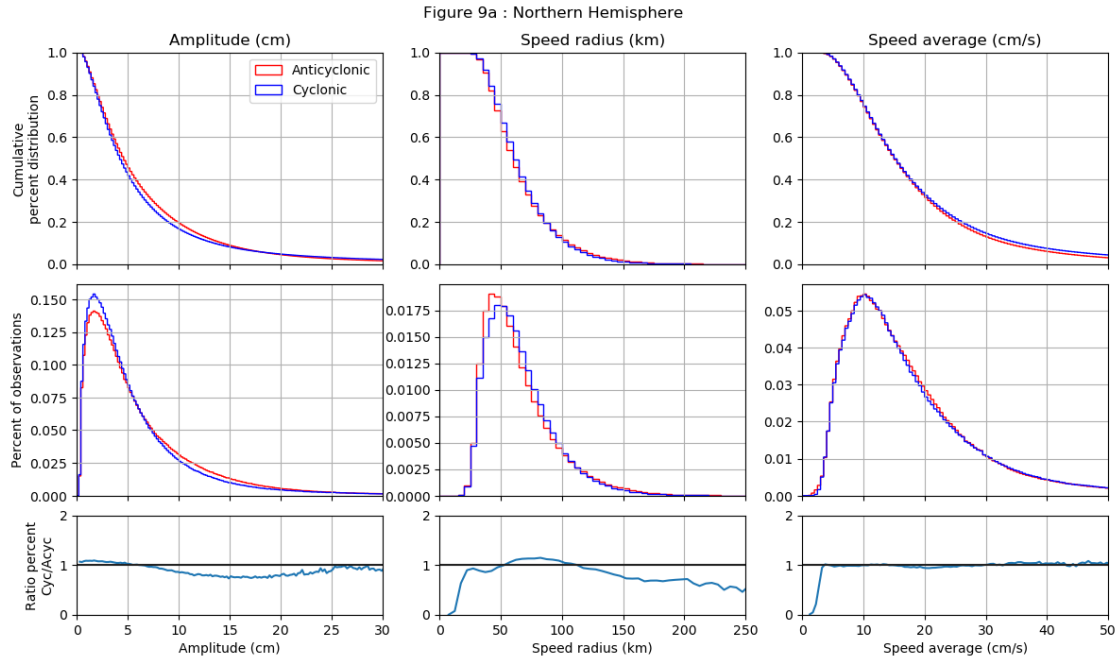
## 2.8 Figure 9 - Parameter's distributions

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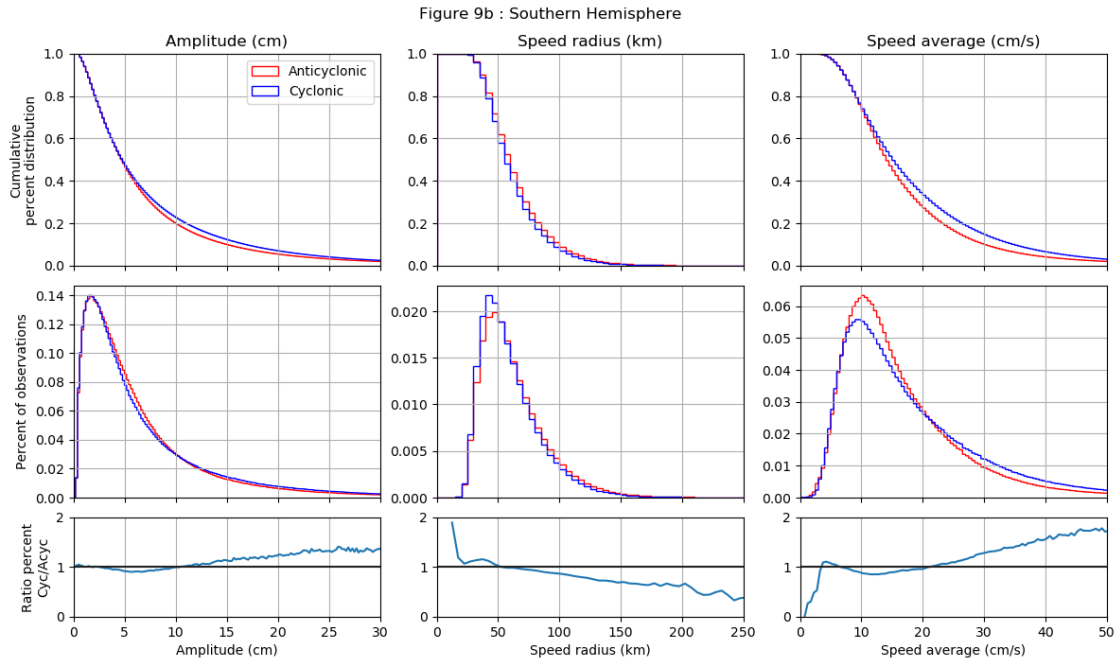


The distributions of the amplitudes, speed-based radius scales, and rotational speeds (left to right) of eddies with lifetimes  $\geq 16$  weeks in (a) the northern hemisphere and (b) the southern hemisphere. Upper-tail cumulative histograms and histograms are shown in the first and second rows of panels, respectively, with blue and red lines corresponding, respectively, to histograms for cyclonic and anticyclonic eddies. The ratios of cyclonic to anticyclonic eddies are shown in the third rows of panels. The global two-dimensional histogram of the joint distribution of the amplitude and speed radius is shown in panel (c).

North



South



## 2.9 Figure 10 - Amplitude

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- (a) Map of the average amplitude of eddies with lifetimes  $\geq 16$  weeks. (b) Mean amplitude as a function of latitude.

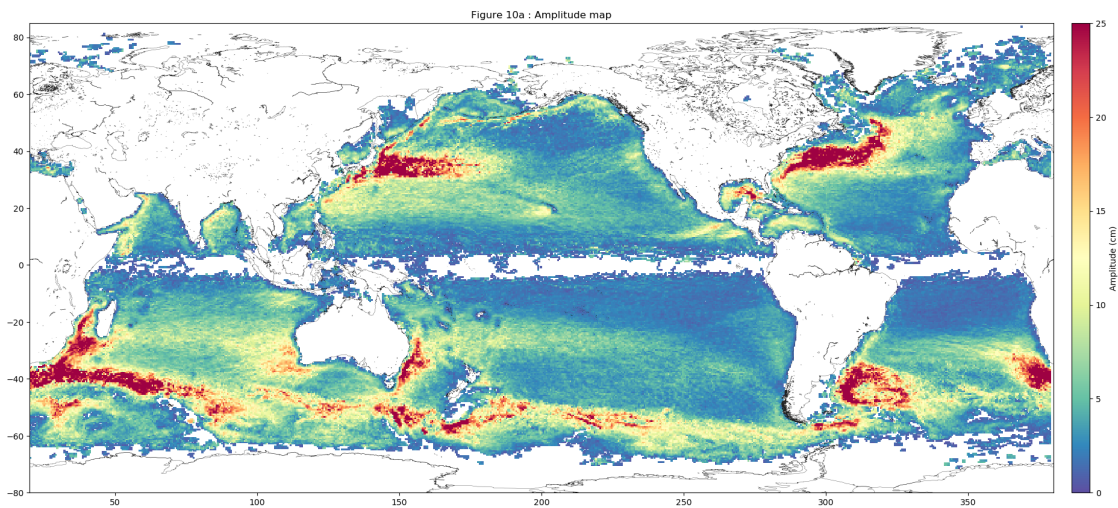
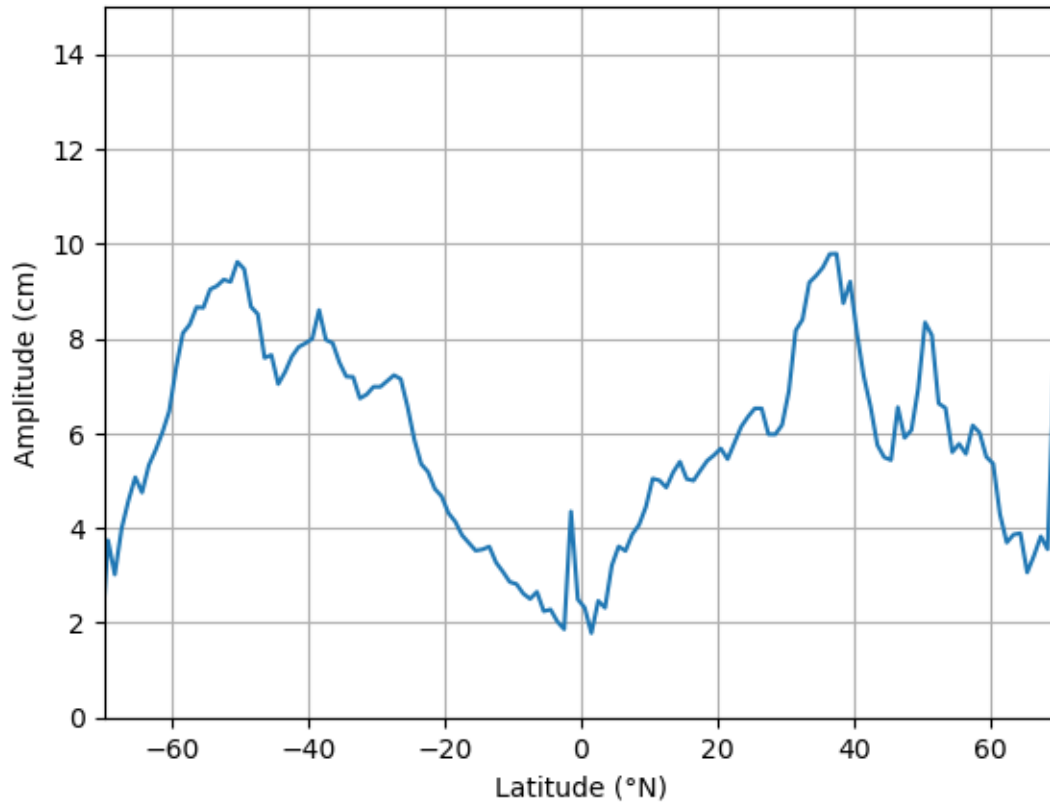


Figure 10b : Mean Amplitude



## 2.10 Figure 12 - Speed radius

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- (a) Map of the average speed radius of eddies with lifetimes  $\geq 16$  weeks. (b) Mean speed radius as a function of latitude.

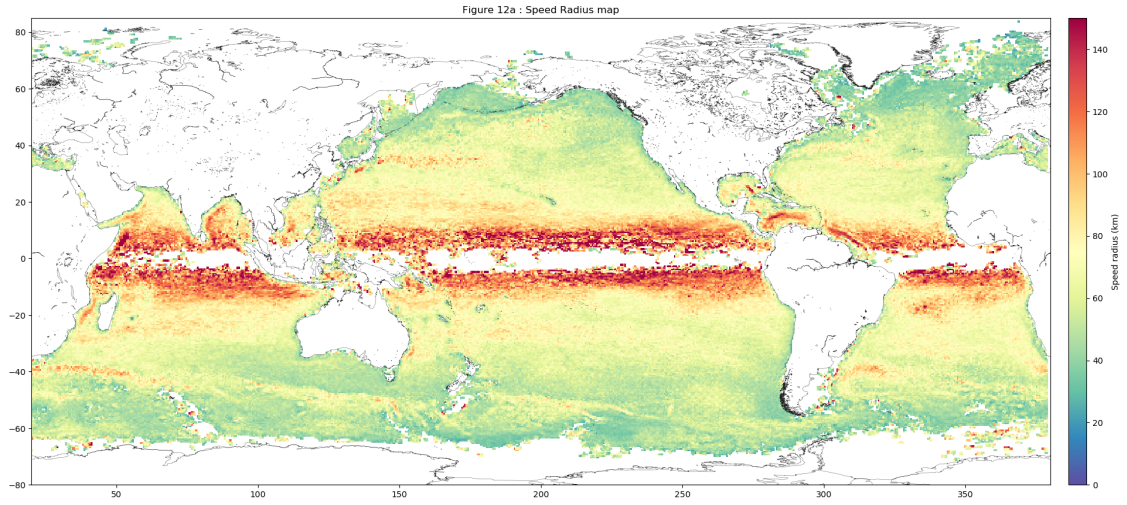
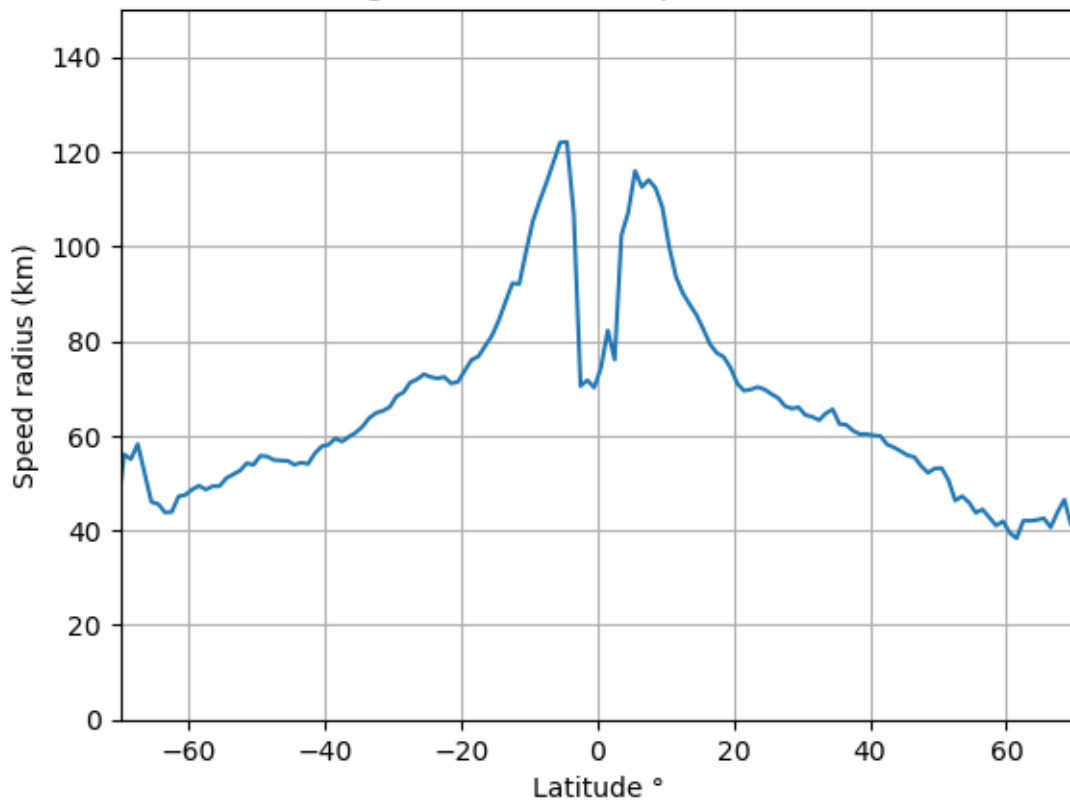


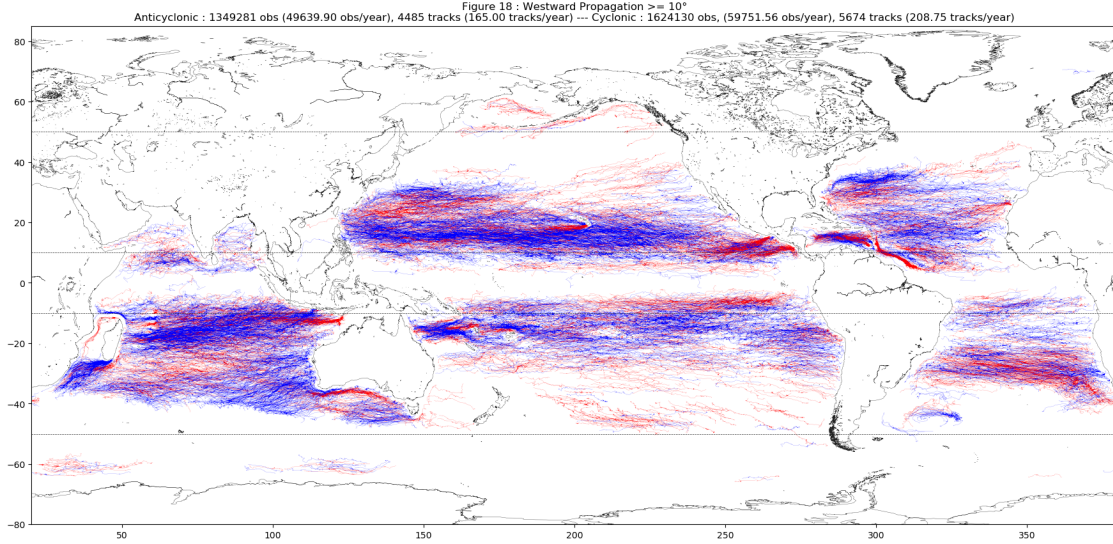
Figure 12b : Mean Speed Radius



## 2.11 Figure 18 - Long propagation

top

The trajectories of all of the cyclonic (blue lines) and anticyclonic (red lines) eddies with lifetimes  $\geq 16$  weeks and propagating westward a minimum of  $10^\circ$  of longitude. The horizontal lines show the latitude ranges of  $10\text{--}50$  that were considered for the analyses in Figs. 20.



## 2.12 Figure 20 - Deflection

top

The meridional deflections of the cyclonic (upper panels) and anticyclonic (lower panels) eddies with lifetimes  $\geq 16$  weeks and starting points at latitudes between  $10^\circ$  and  $50^\circ$  of both hemispheres that propagated westward a minimum of  $10^\circ$  of longitude (see Fig. 18). The left panels show the changes in longitude (negative westward) and latitude (positive for poleward and negative for equatorward) relative to the initial location of each eddy. The right panels show histograms of the averaged azimuth of each eddy trajectory, defined as the angle with respect to due west formed by the great circle connecting the starting and ending points of the trajectory.

Figure 20 : Deflection

