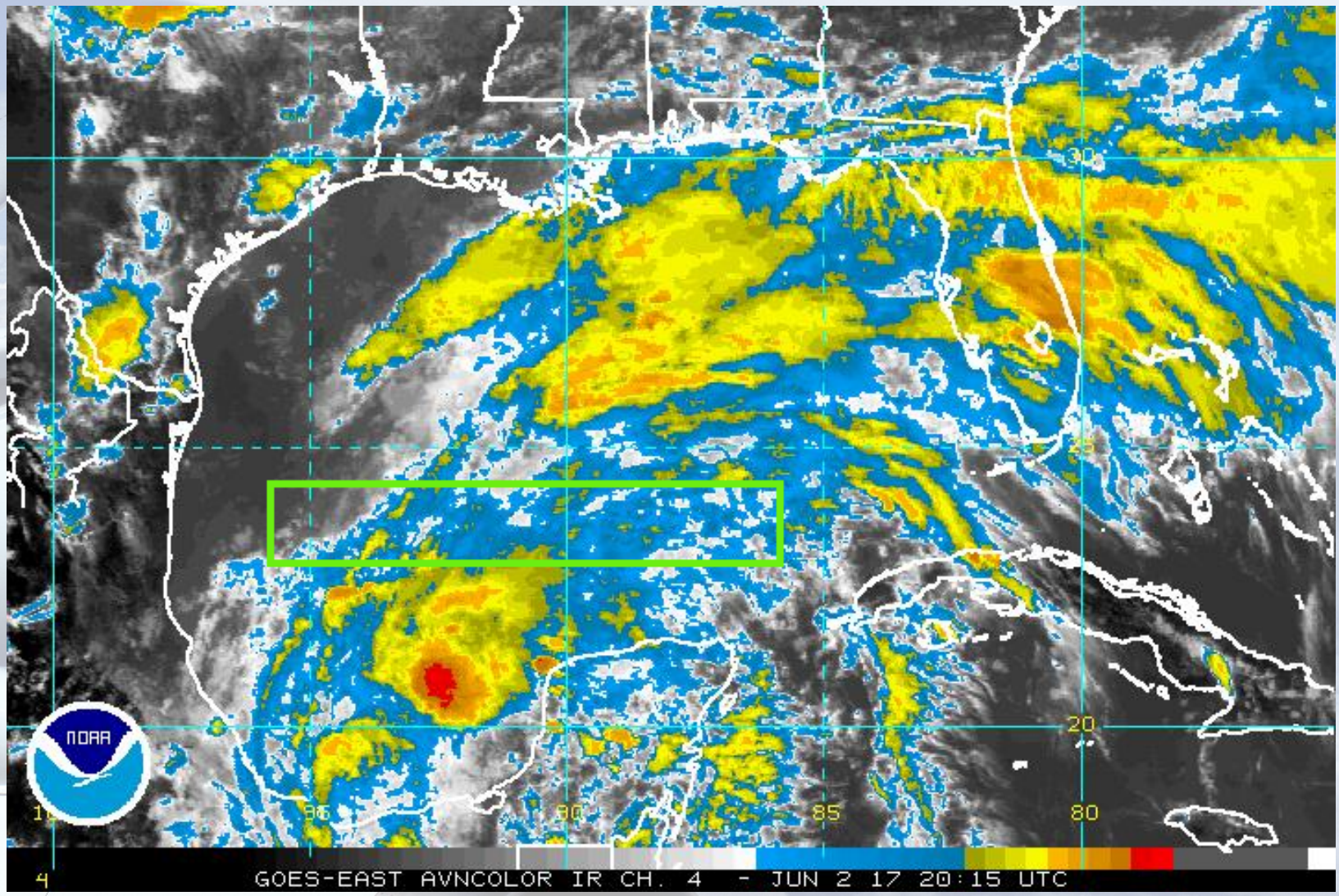
Extra-Tropical transition over the Gulf of Mexico observed during the CPEX campaign

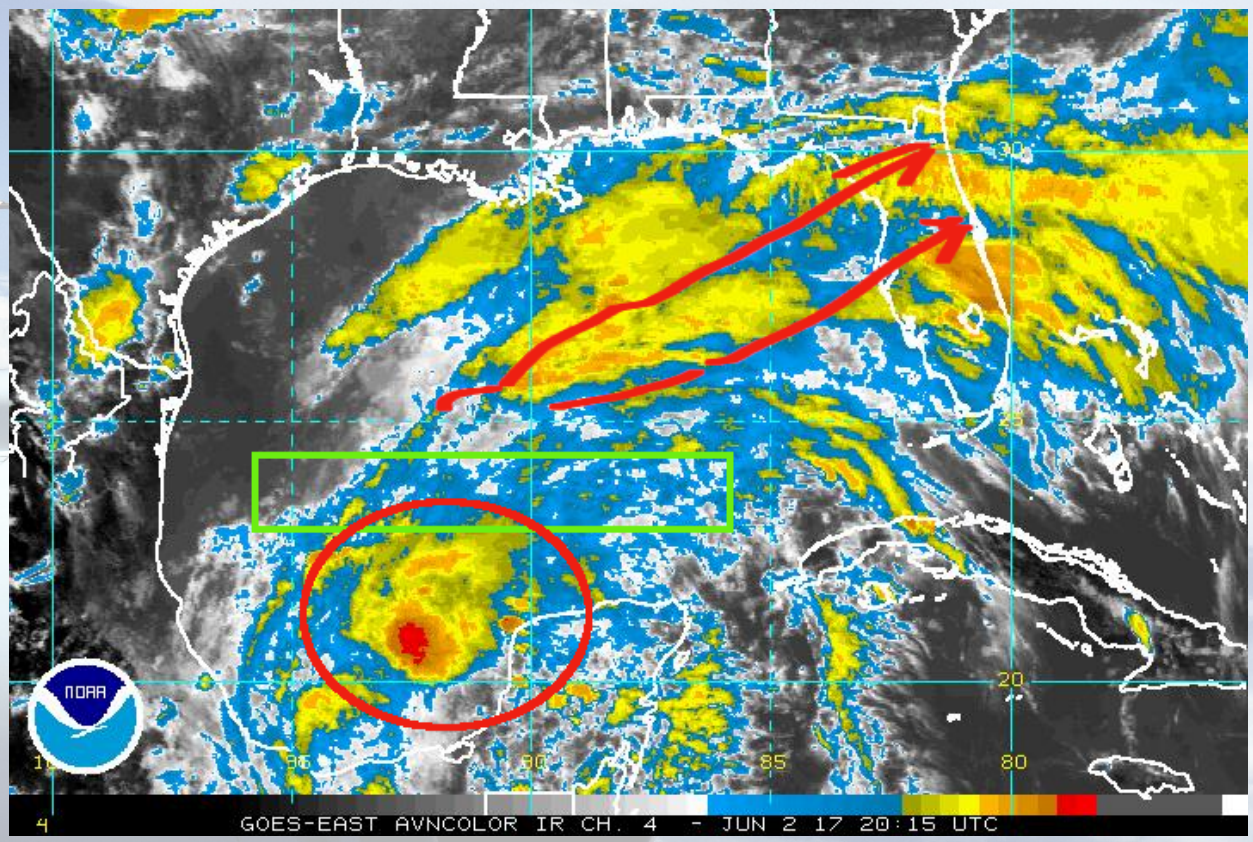
Jose Martinez-Claros

July 16, 2019

Jun 2, 2017 satellite imagery



Motivation

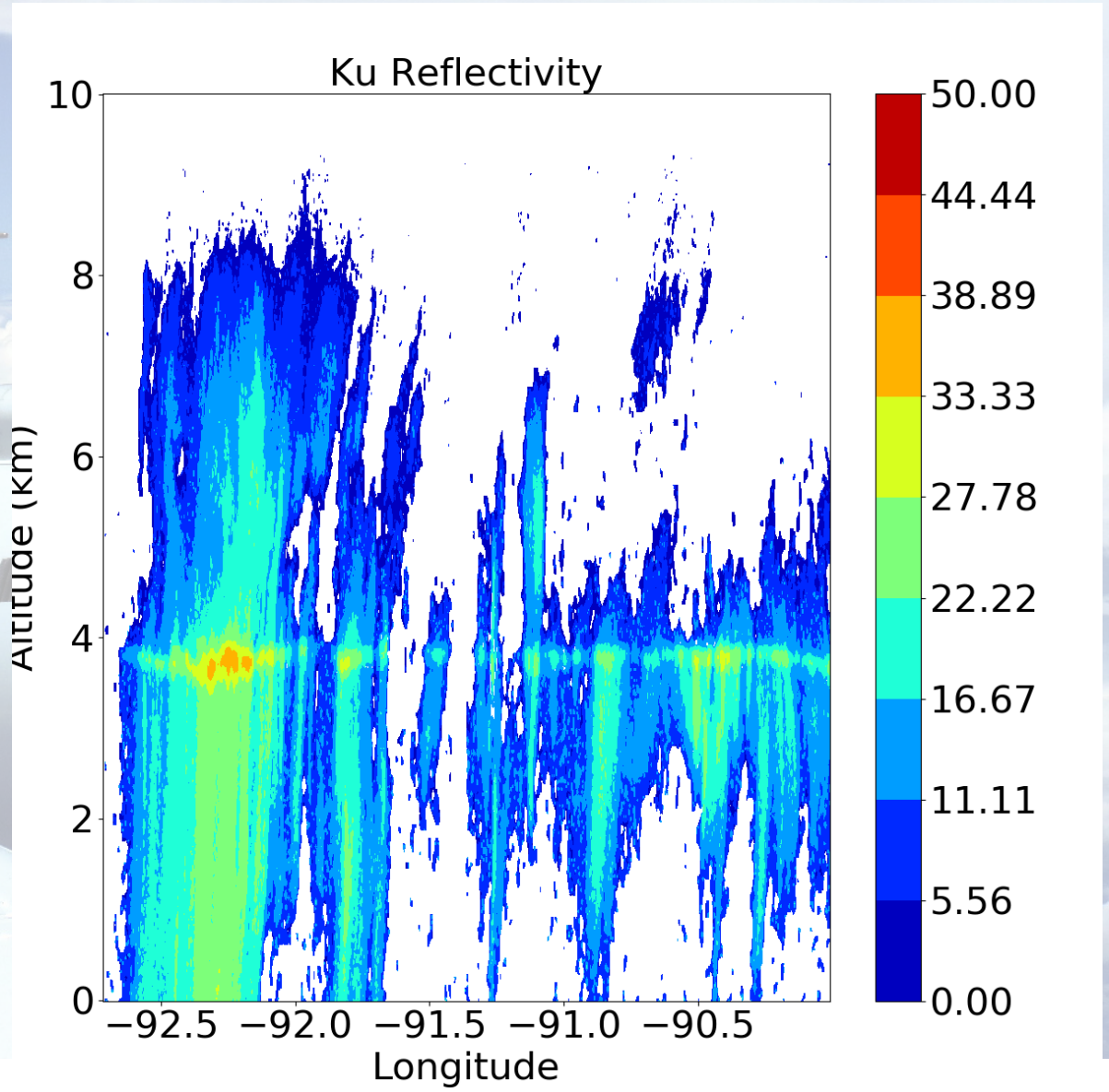


- Remnant outflow of E Pac TS Beatriz
- Atmospheric river inflow from W Atlantic (?)

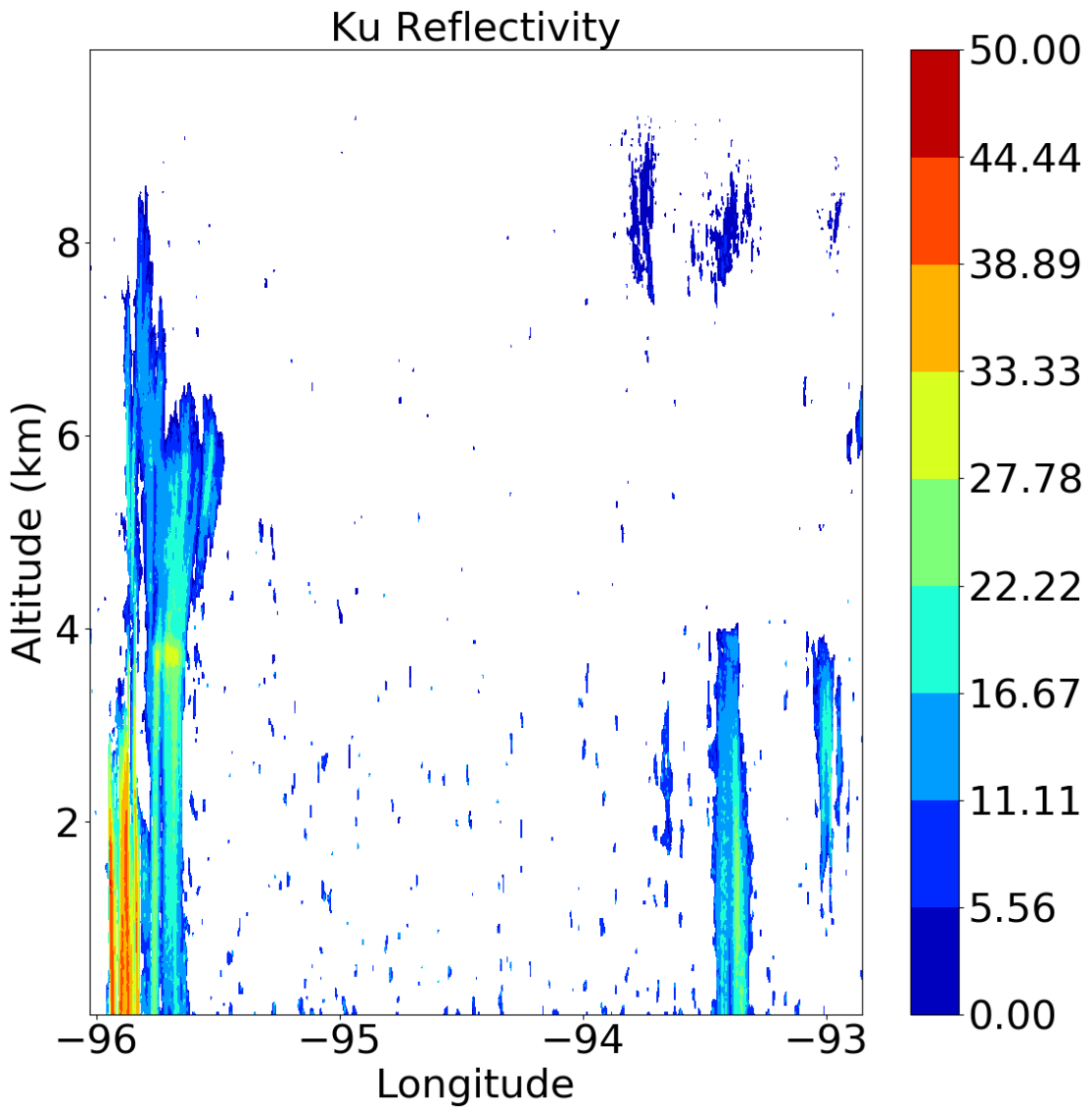
Data

- Dropsondes (15 successfully deployed)
- APR-2 Radar
- **FNL model data (new!)**

Radar scans. Example 1: stratiform cloudiness

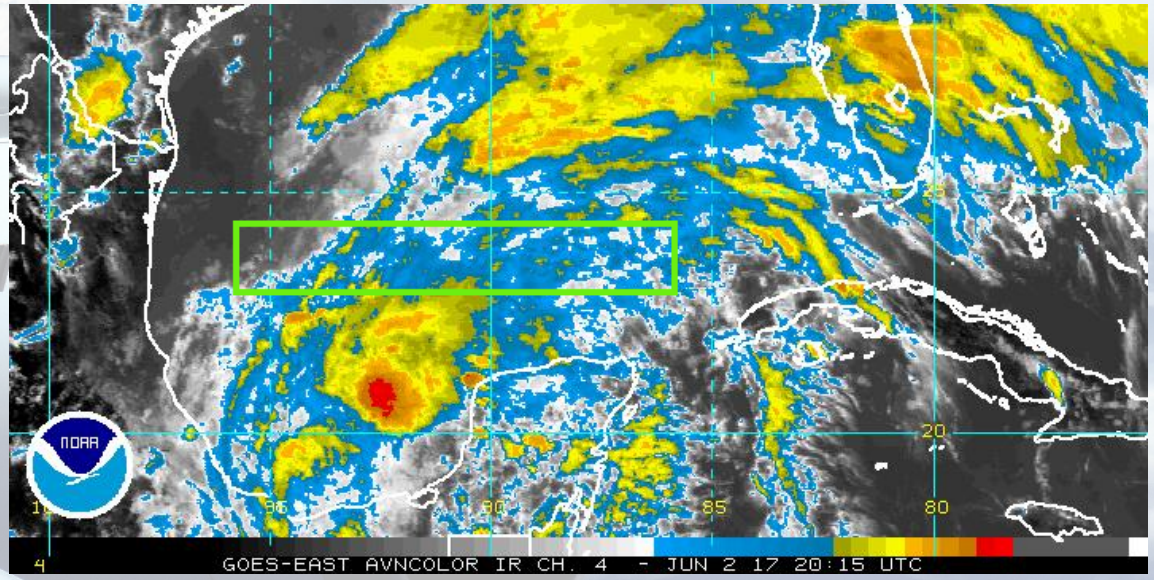


Radar scans. Example 2: deep convection

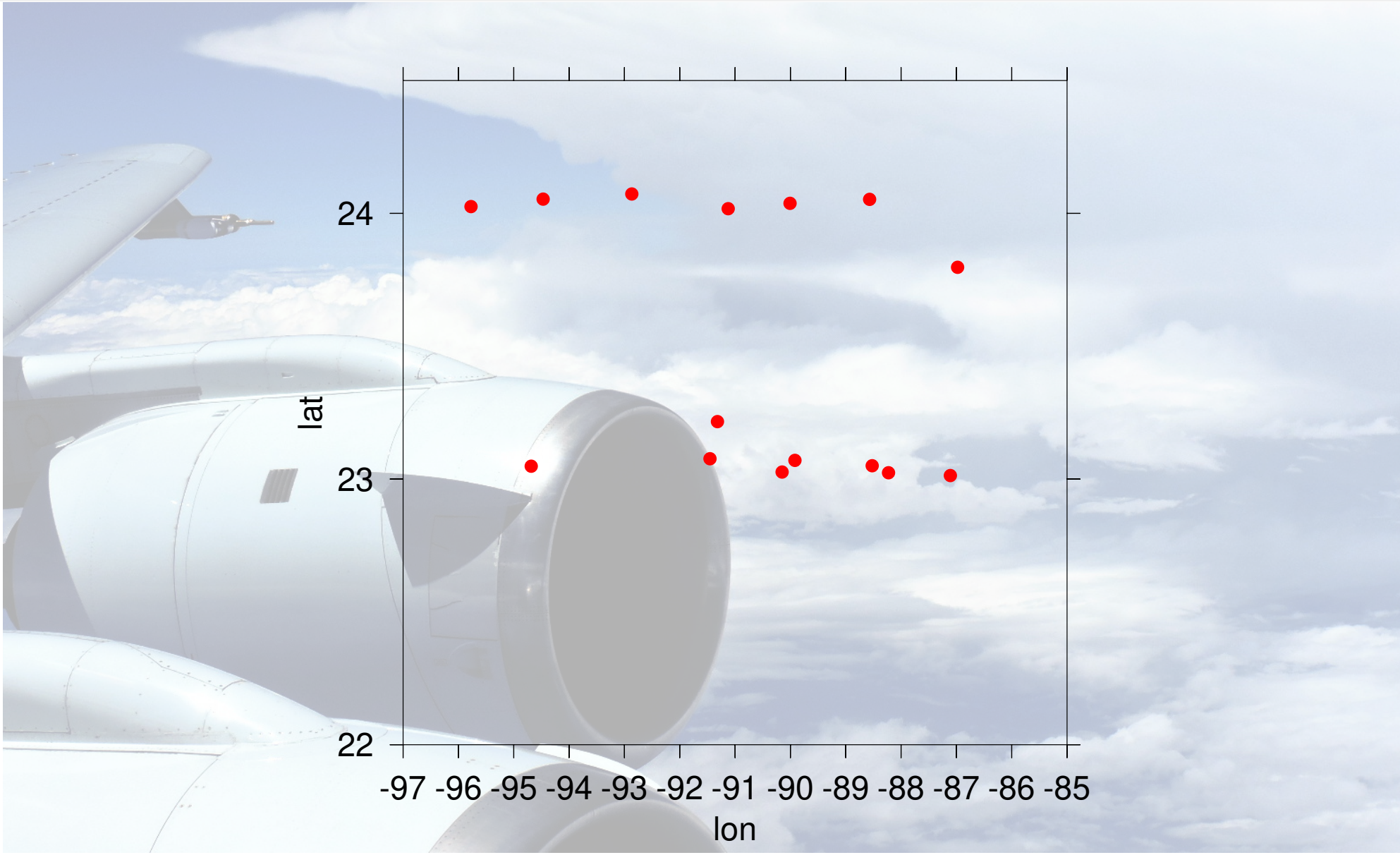


Dropsondes

- 15 successfully deployed at two cross-sections
- 3DVar tool used to construct horizontally interpolated grid



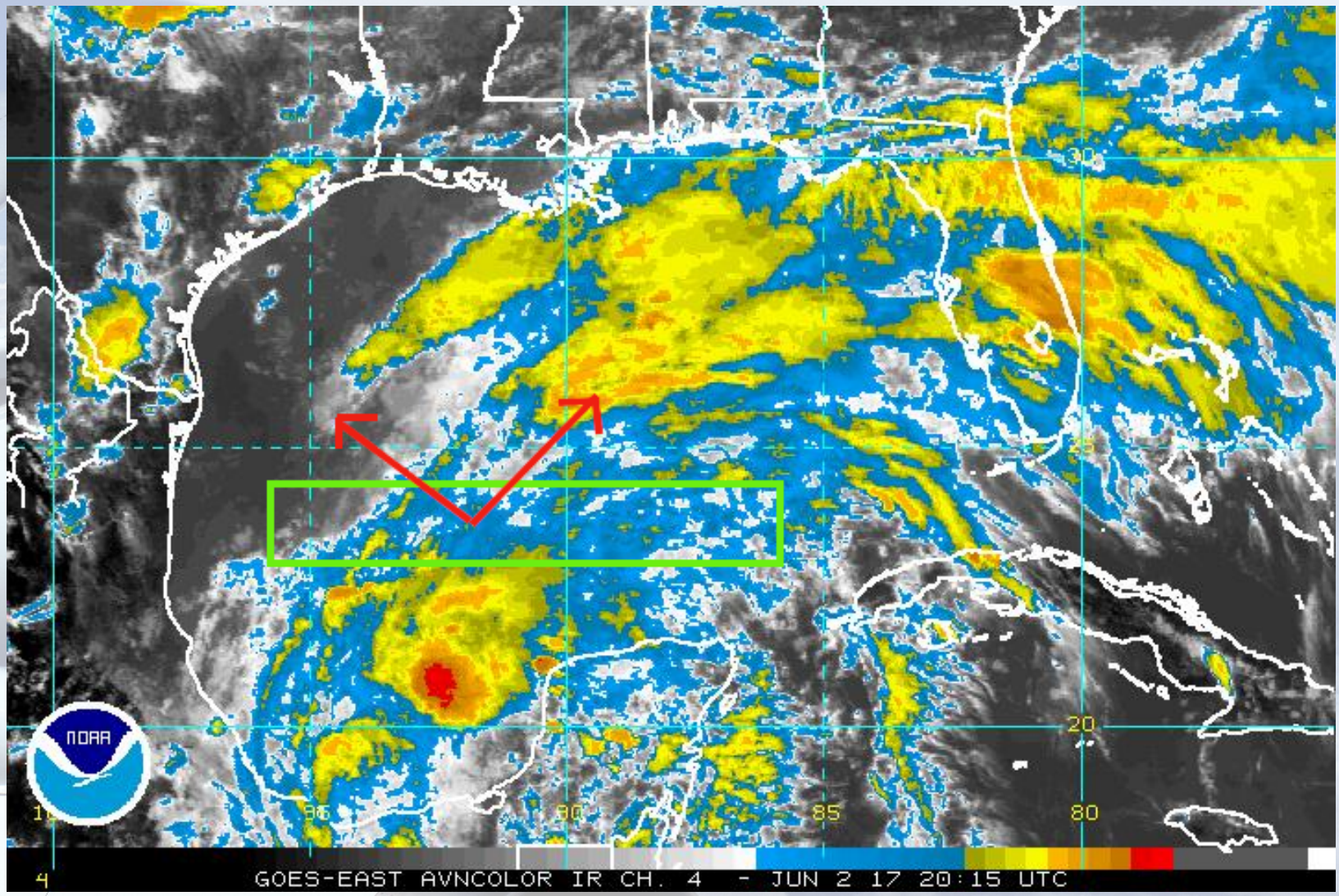
Dropsonde grid



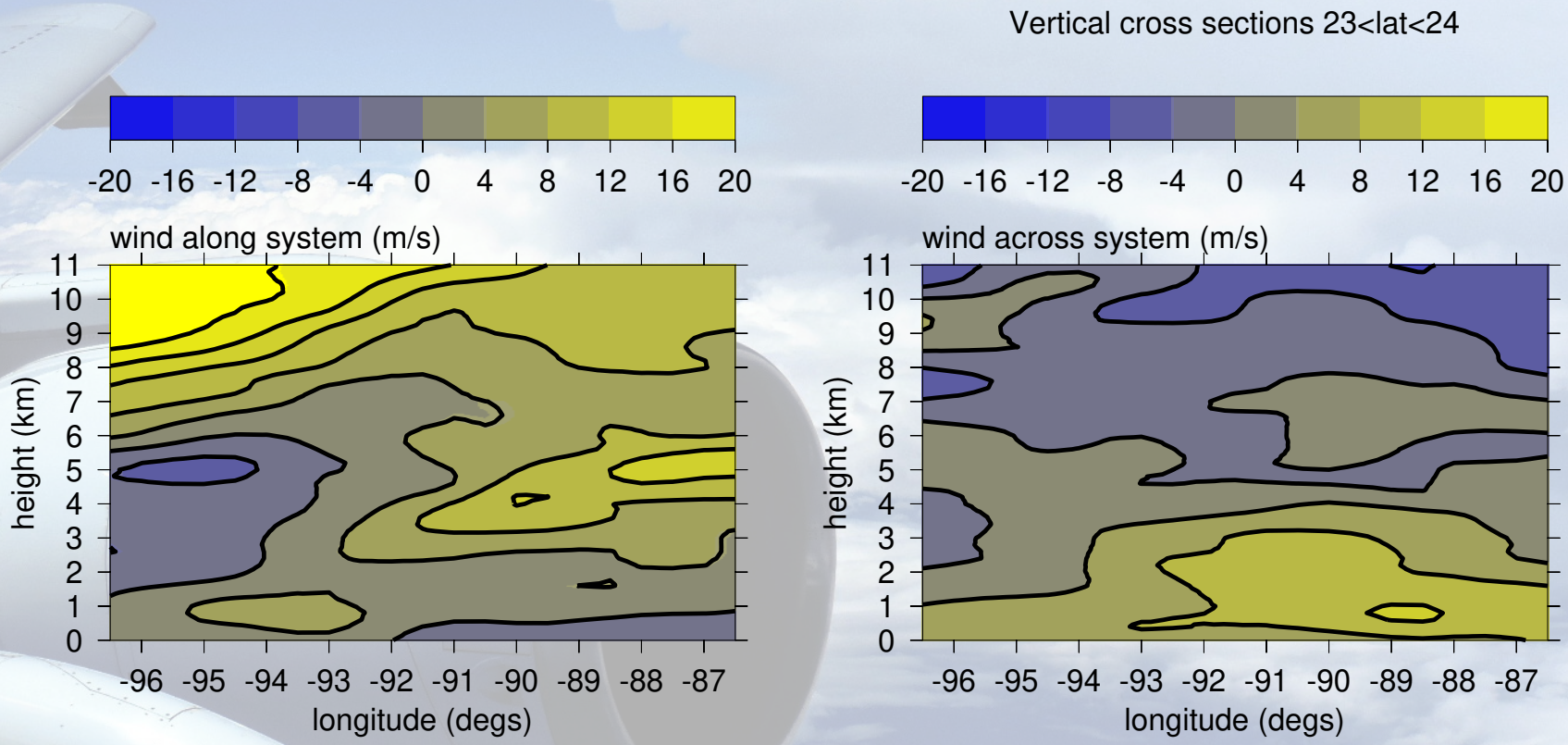
3DVar analysis variables (latitude-averaged)

- Wind velocity field
- Moist and saturated-moist entropy
- Z-component of absolute vorticity
- Divergence
- Air Temperature

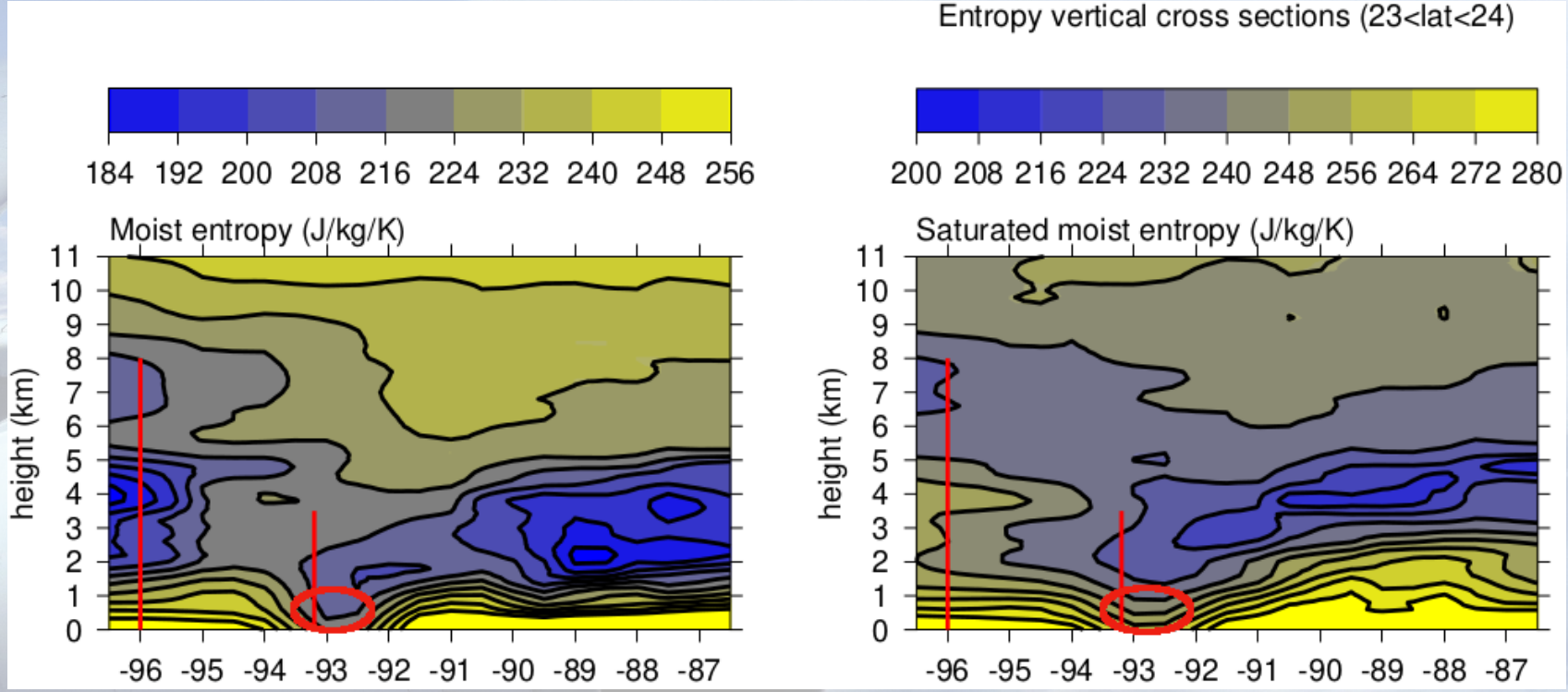
NW-NE reference frame for wind field



Along (NE) and across (NW) system winds

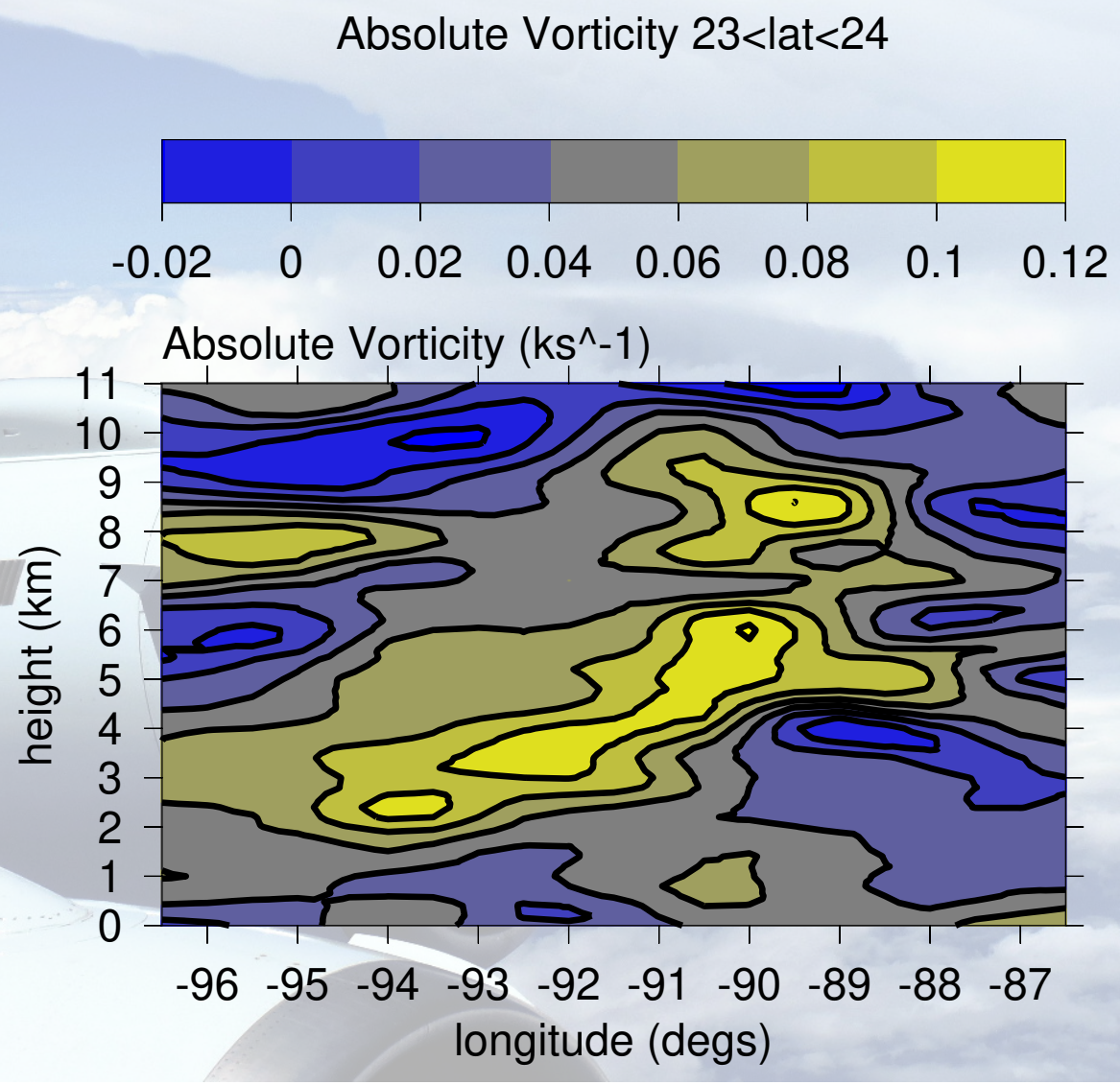


Moist and saturated-moist entropy

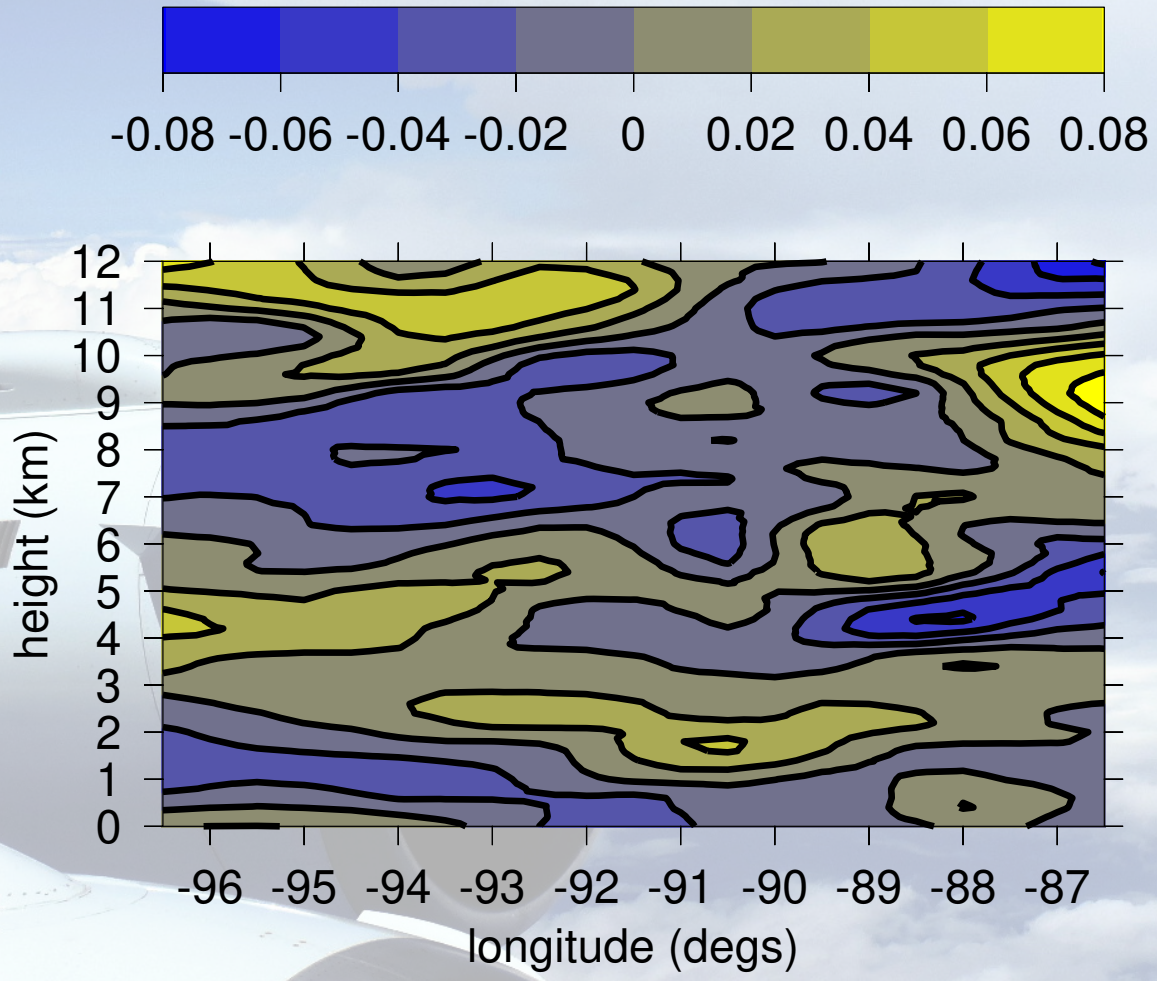


- Moist entropy: measure of moisture
- Saturated-moist entropy: measure of temperature

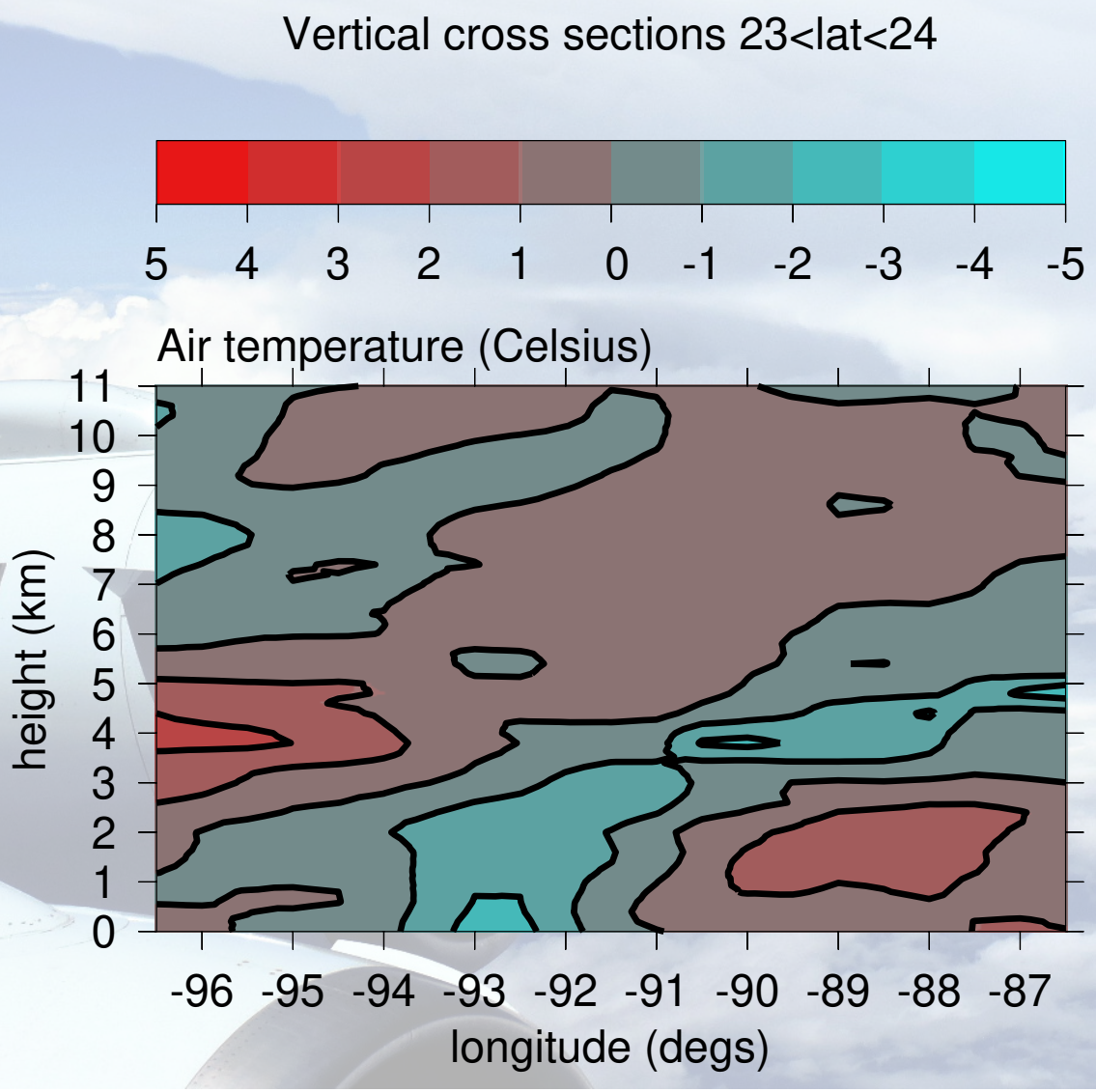
Absolute vorticity



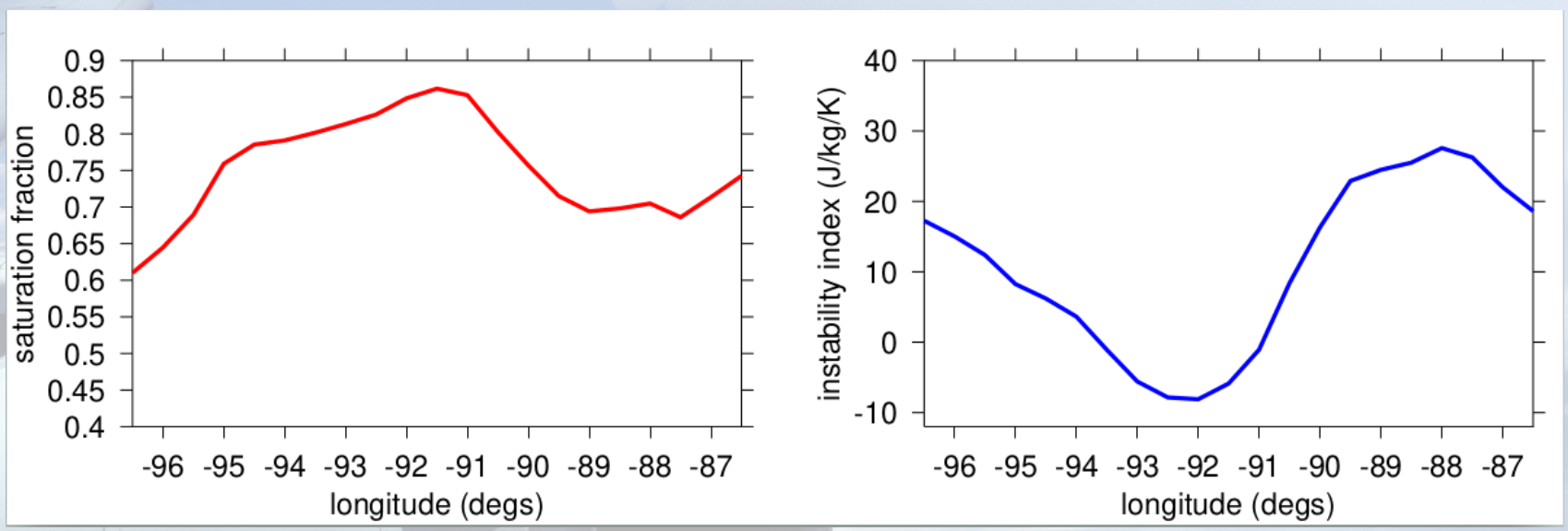
Divergence


-0.08 -0.06 -0.04 -0.02 0 0.02 0.04 0.06 0.08
height (km)
12 11 10 9 8 7 6 5 4 3 2 1 0
-96 -95 -94 -93 -92 -91 -90 -89 -88 -87
longitude (degs)

Air temperature anomaly



Saturation fraction and instability index

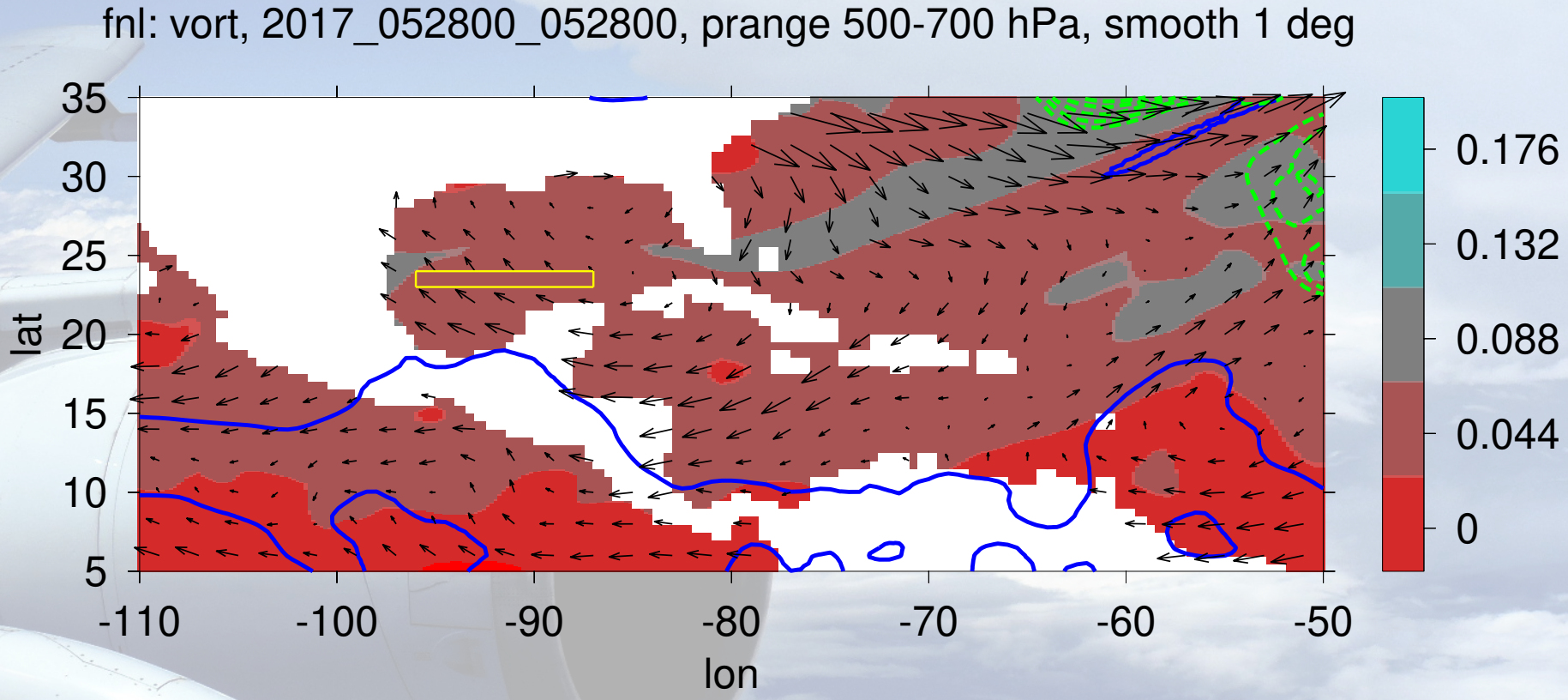


$$S = \frac{\int r dp}{\int r^* dp}$$

$$I = s^*_{low} - s^*_{mid}$$

FNL plots: Gulf of Mexico and Caribbean

Vorticity at 500-700 hPa levels (05/28/2017 - 06/06/2017)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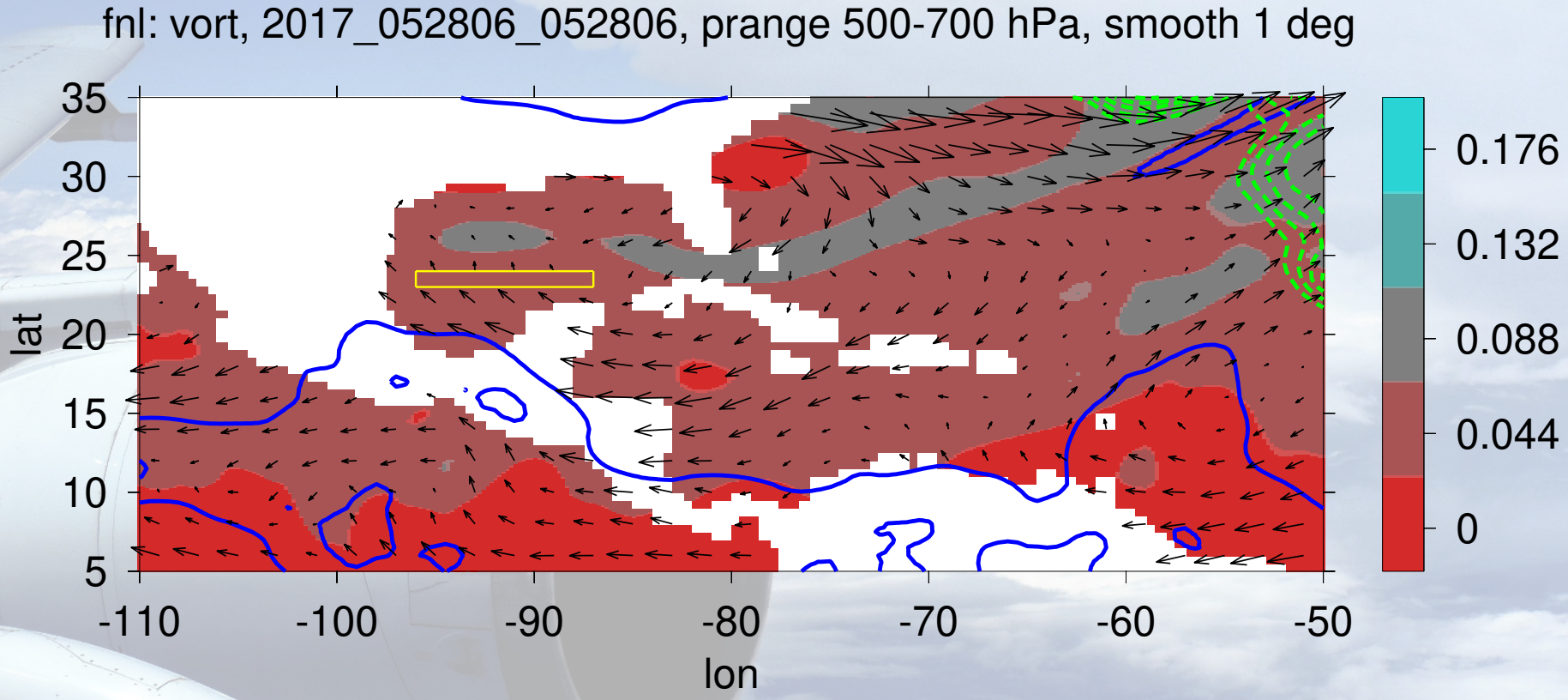
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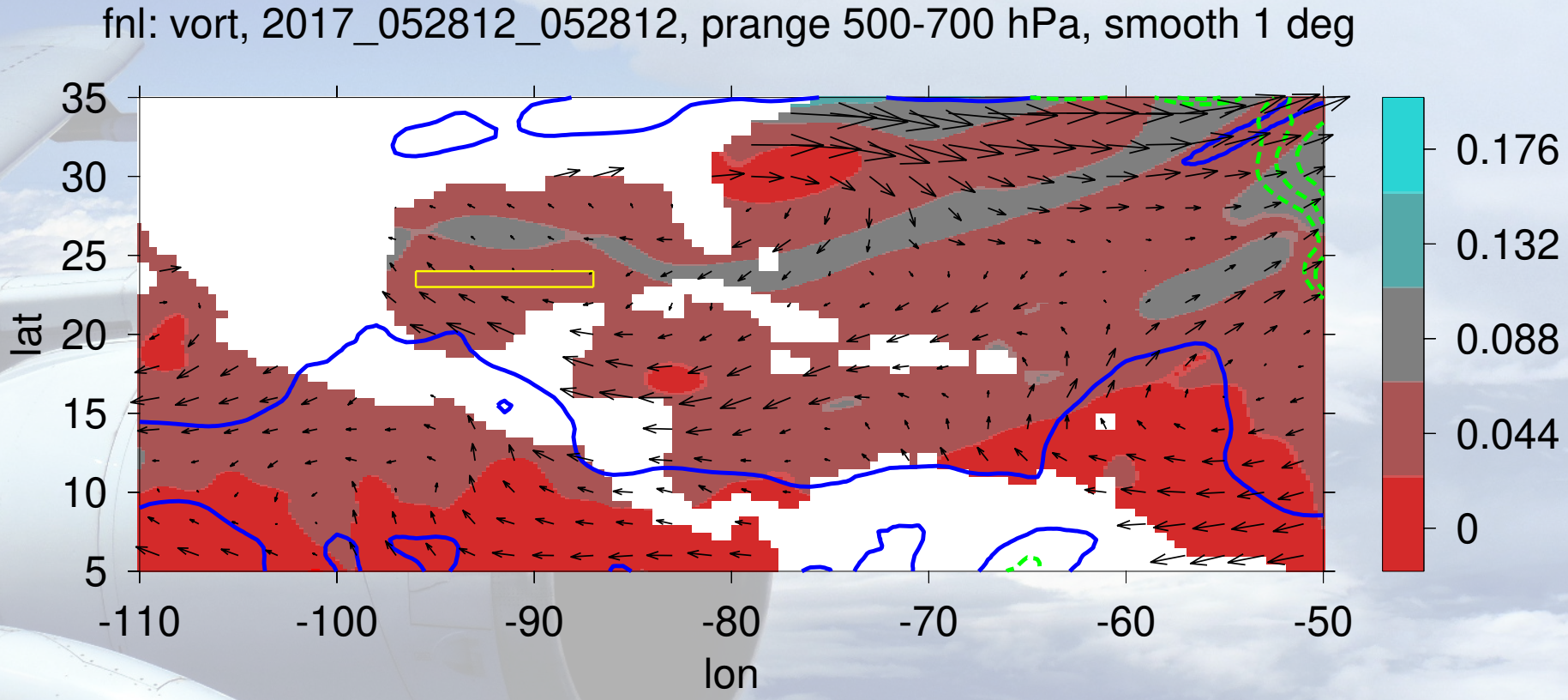
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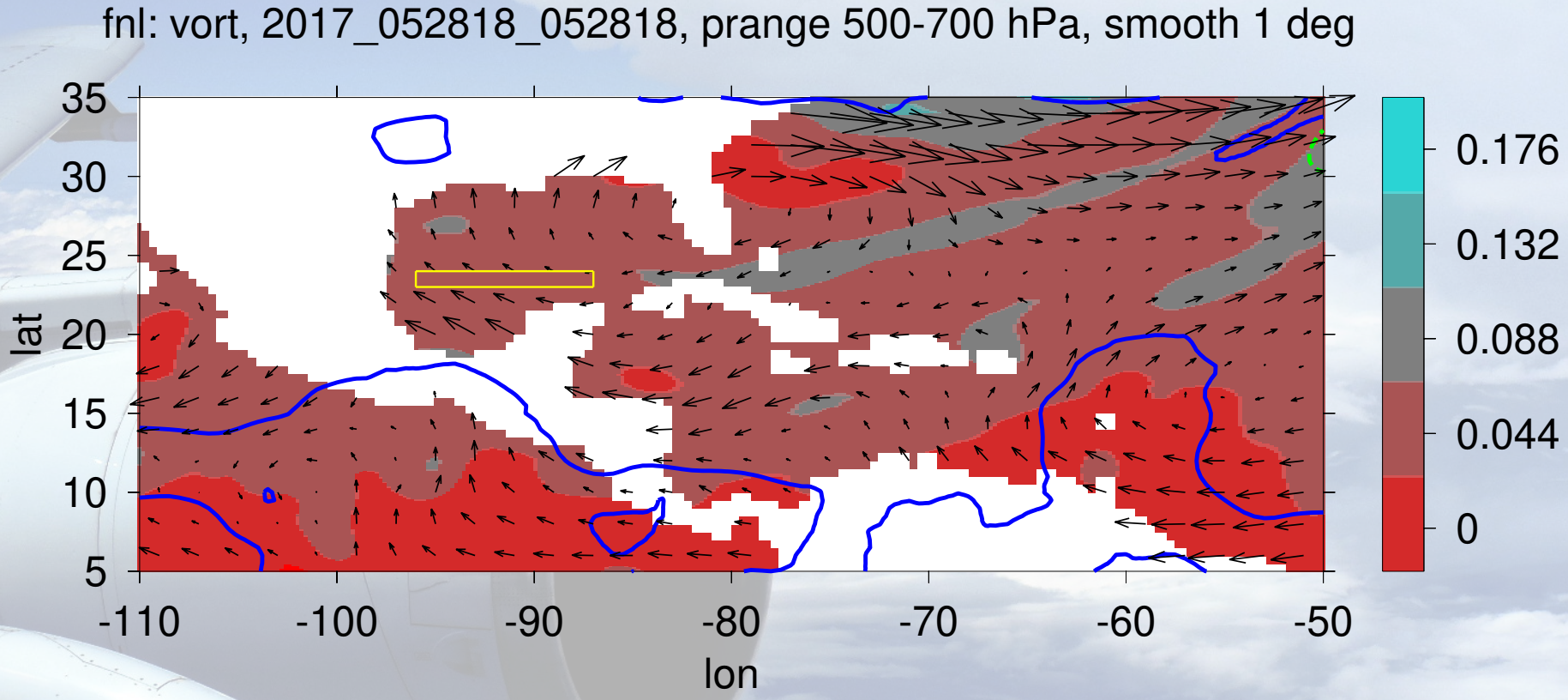
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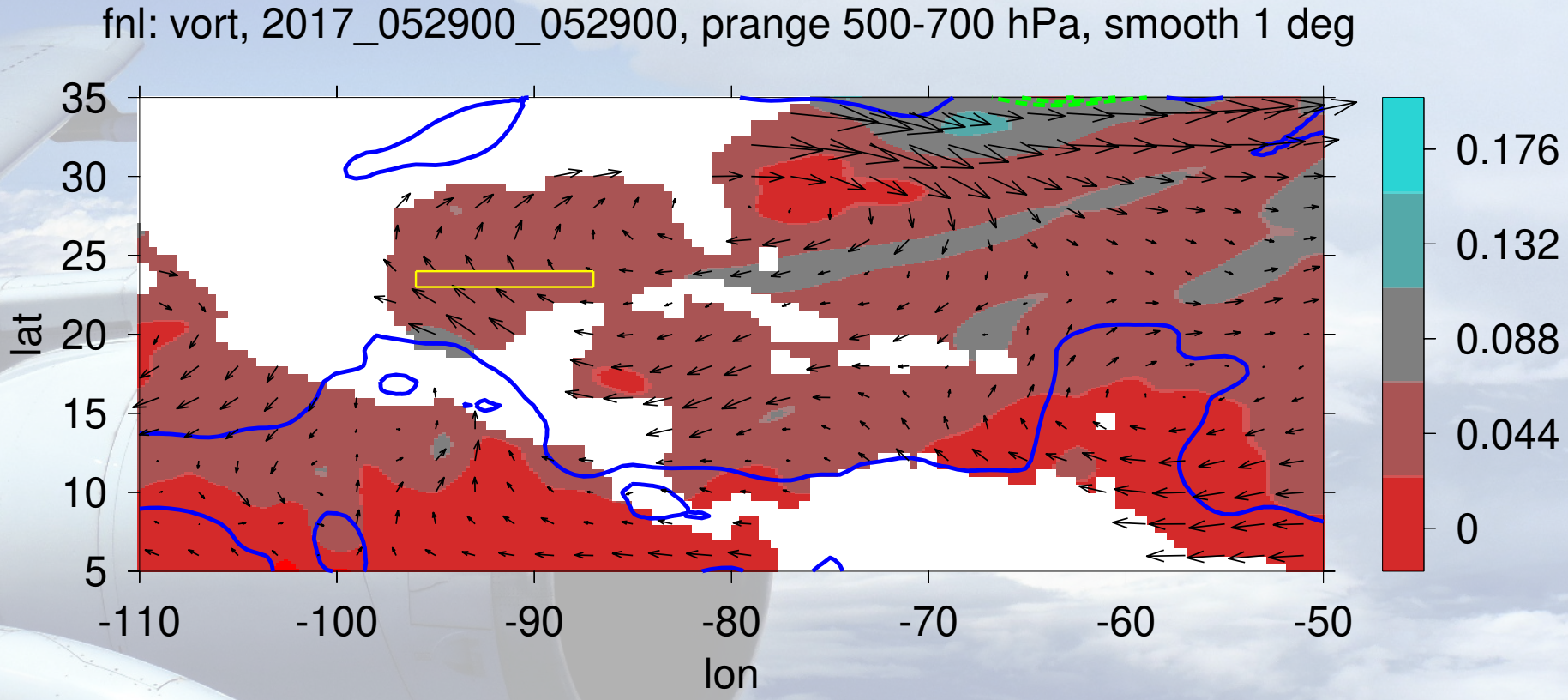
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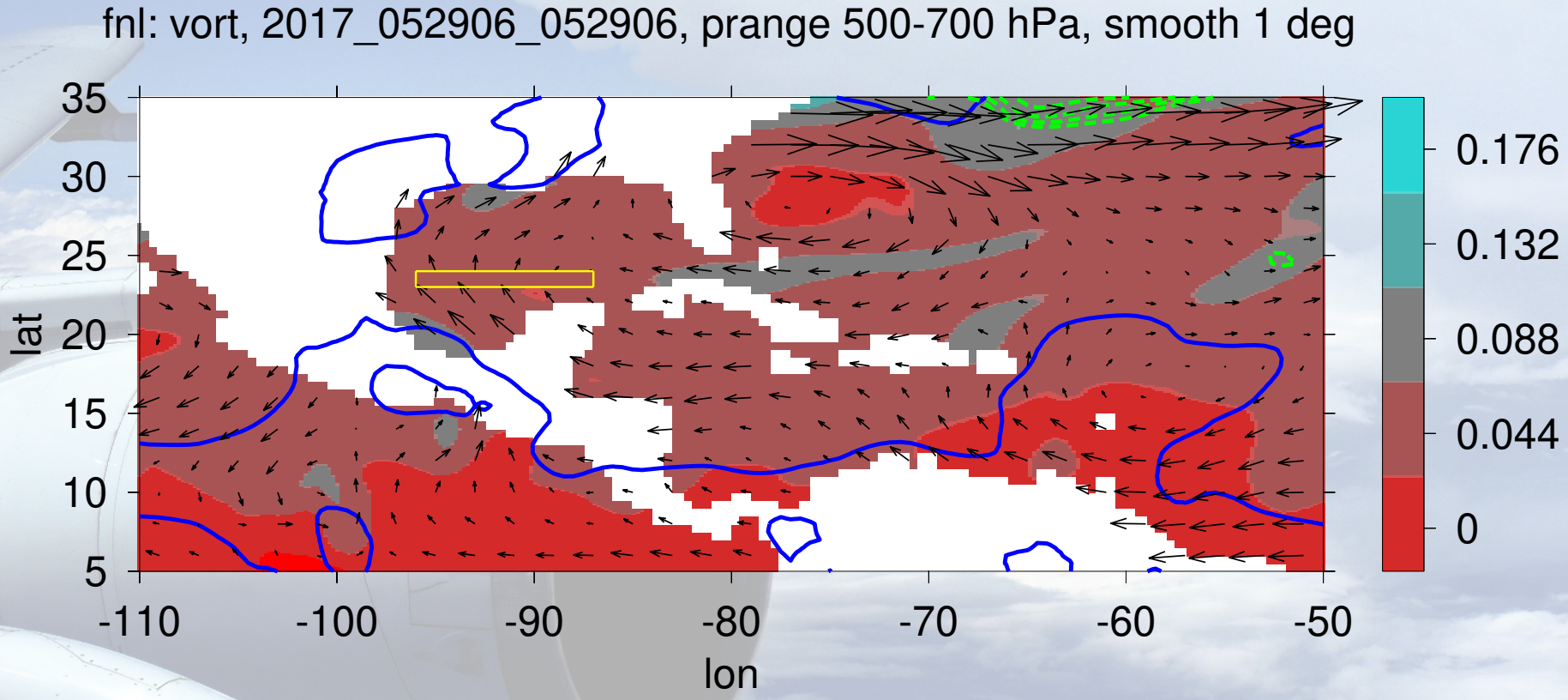
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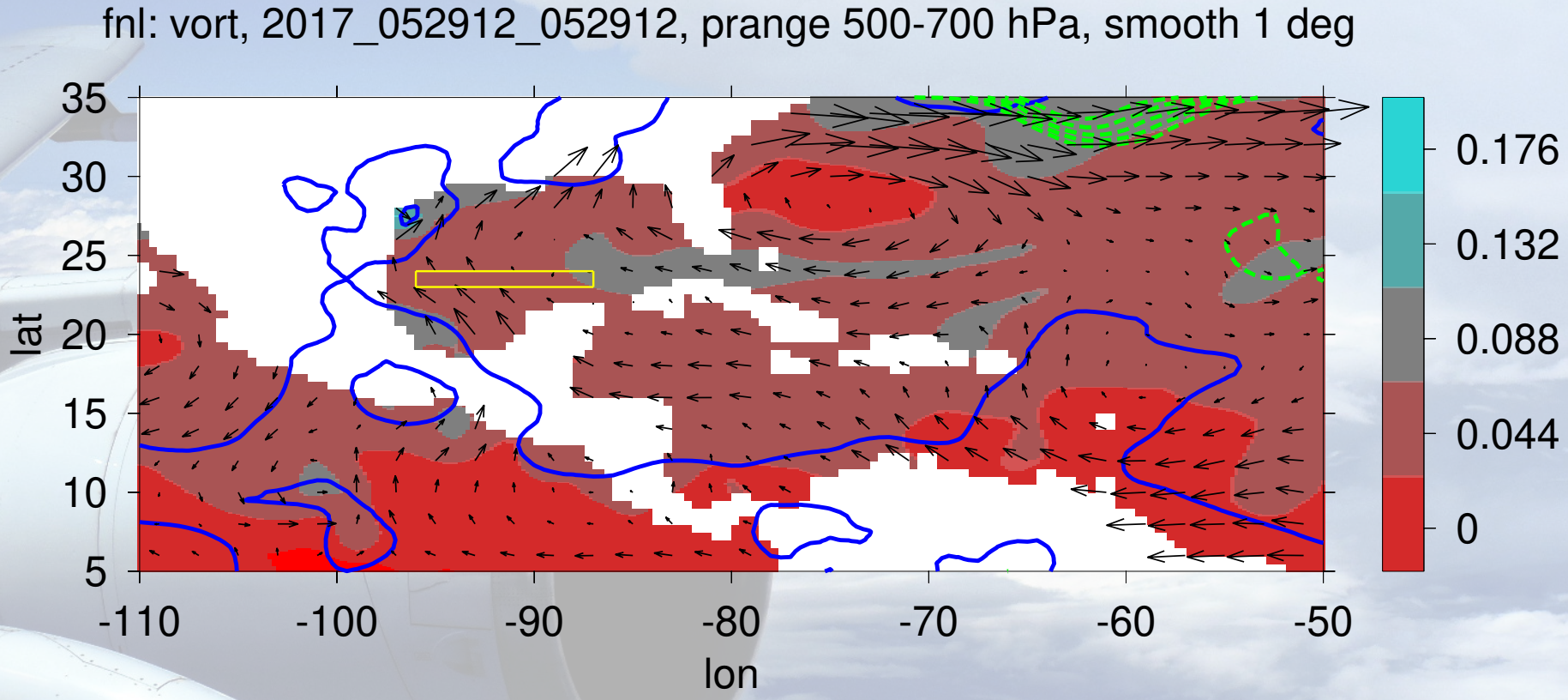
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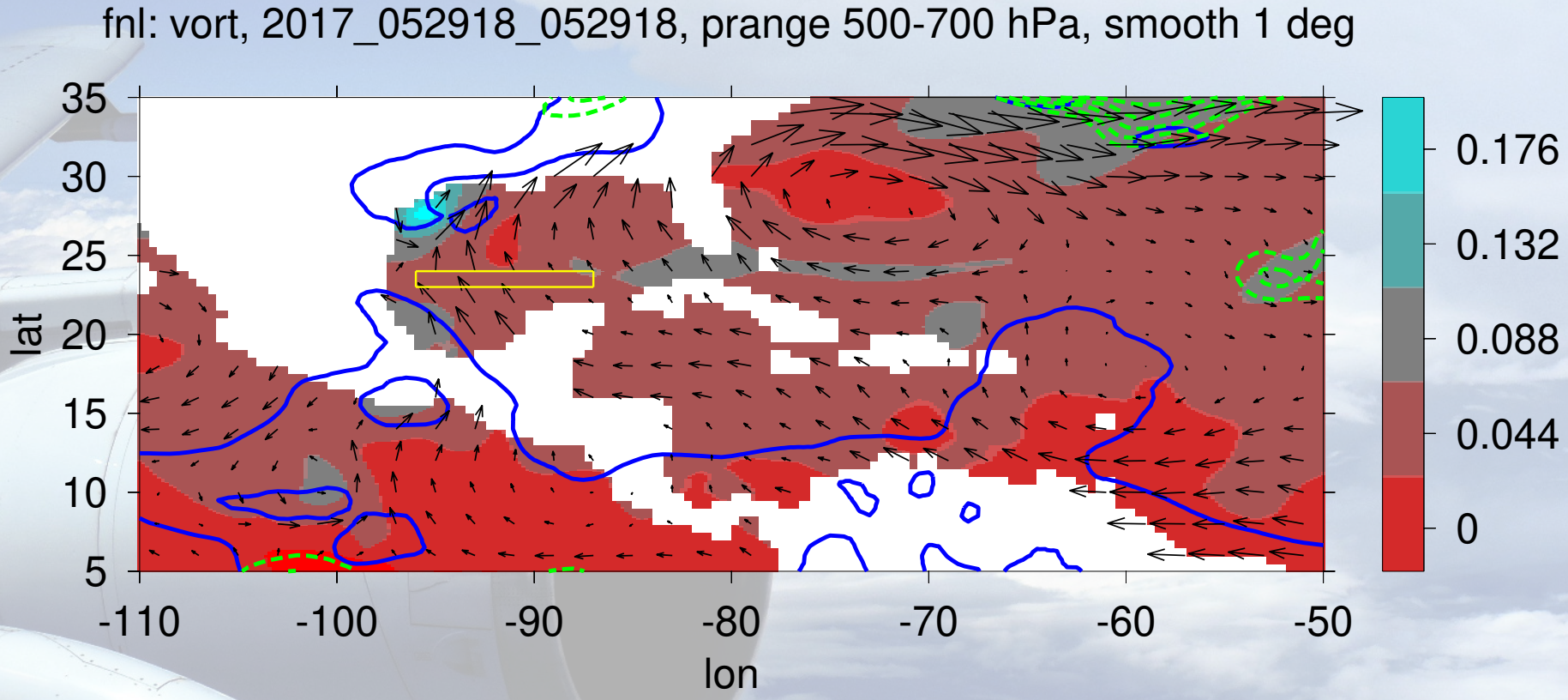
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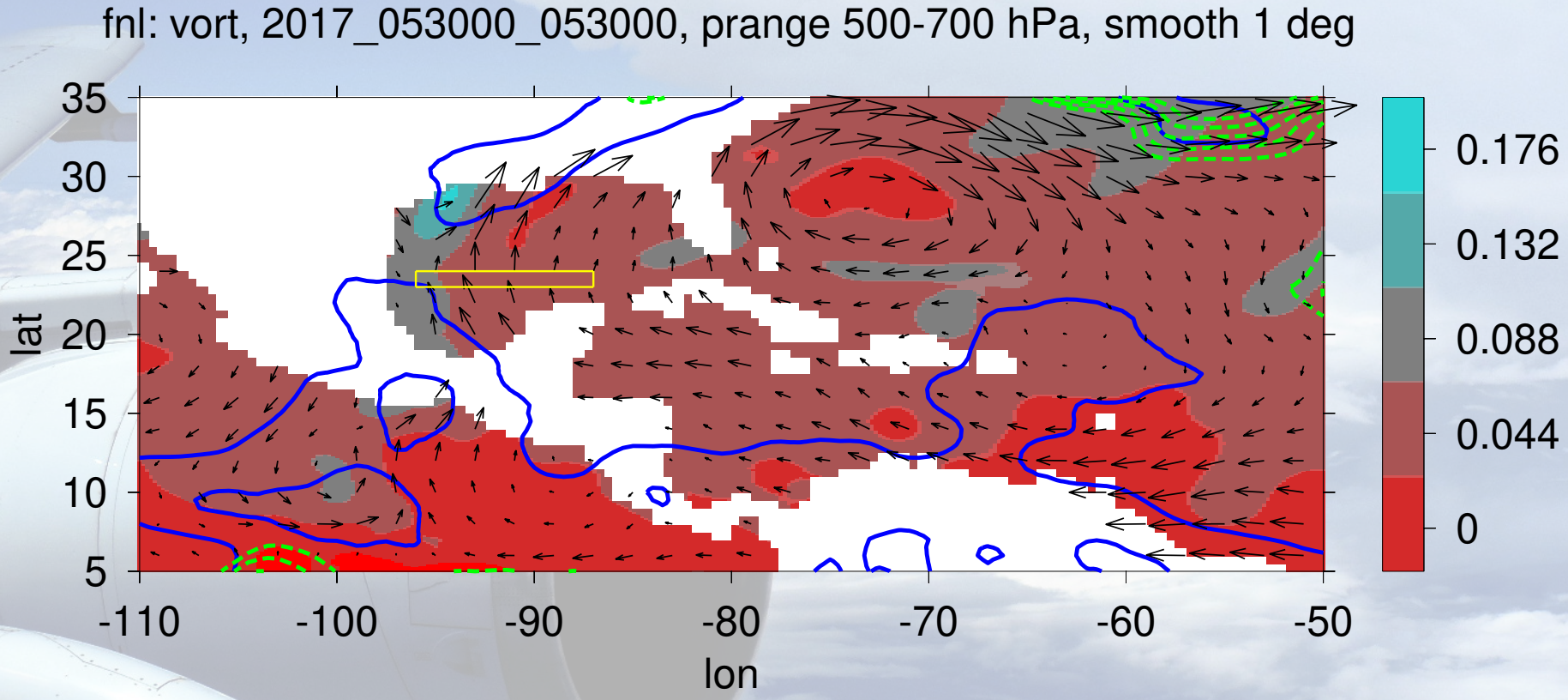
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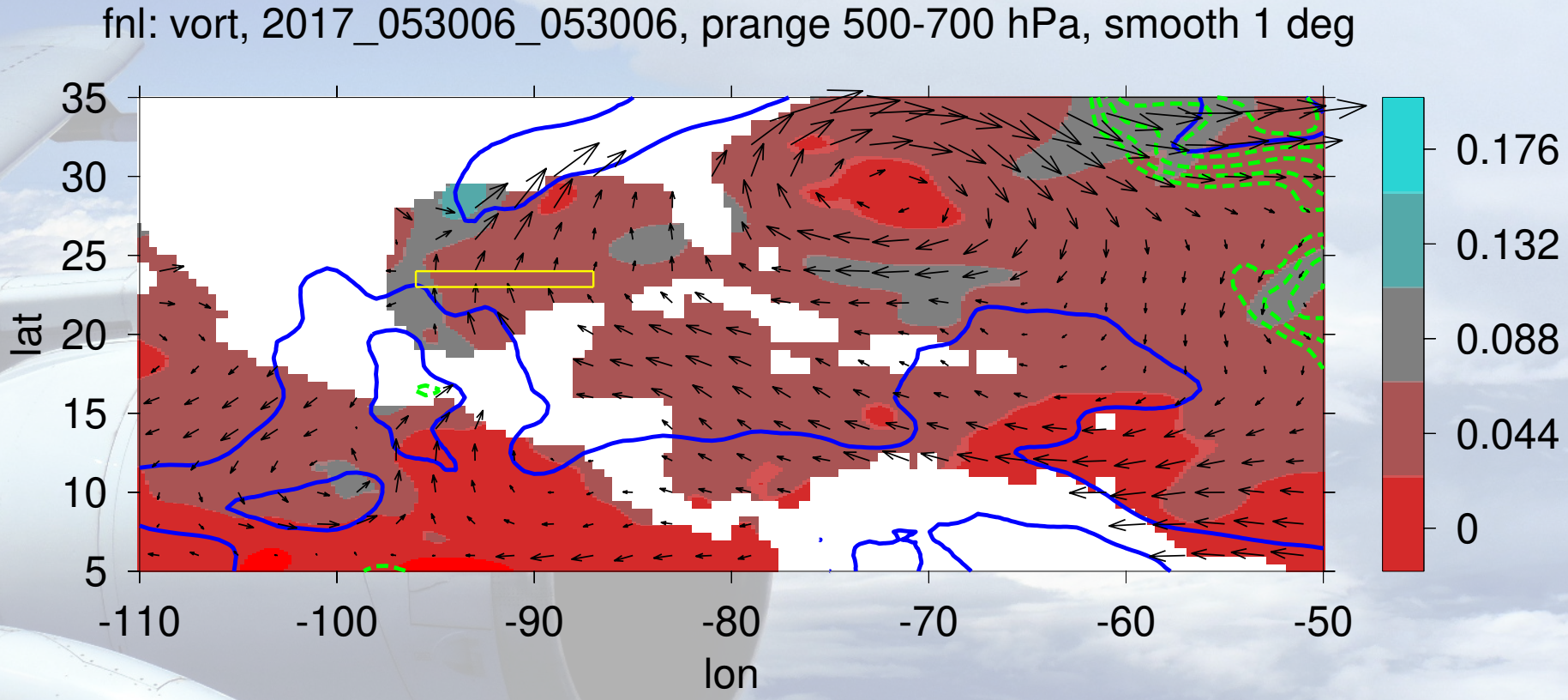
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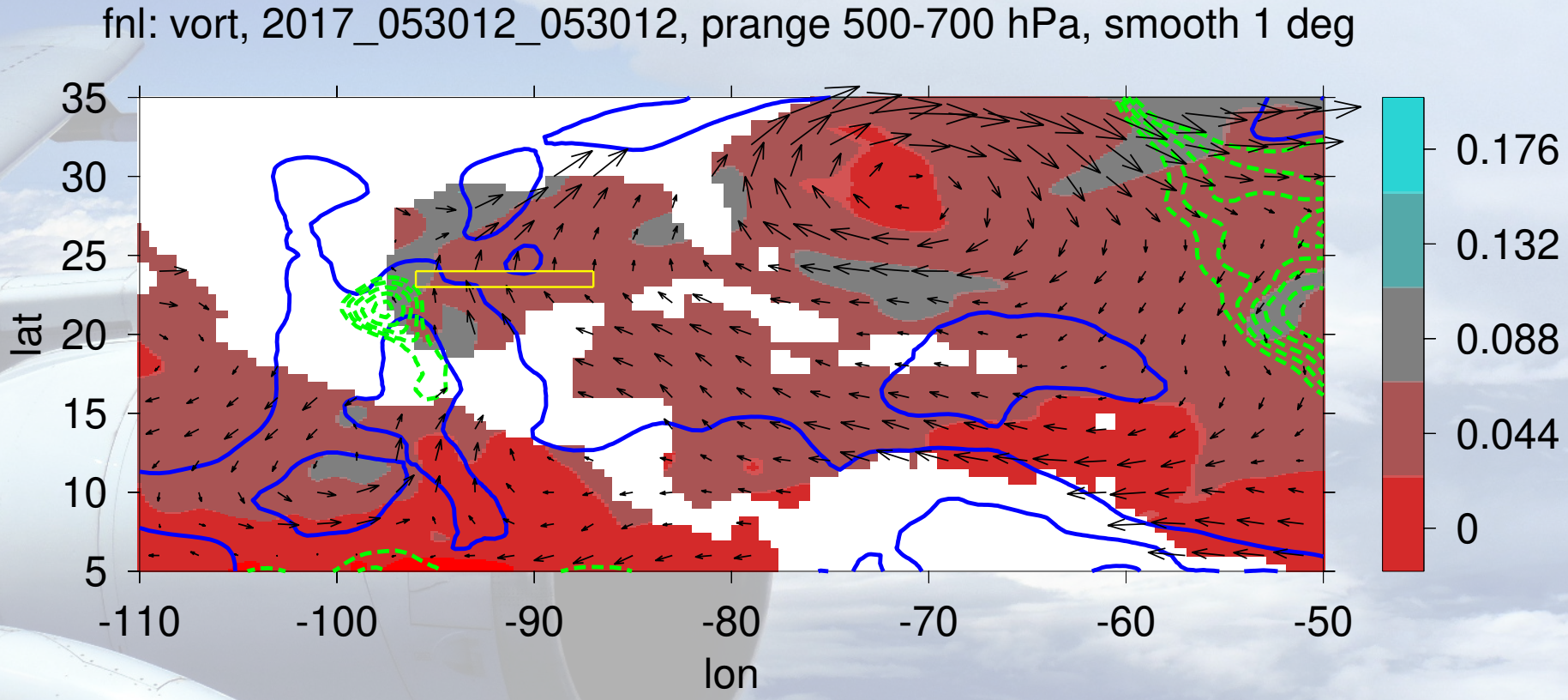
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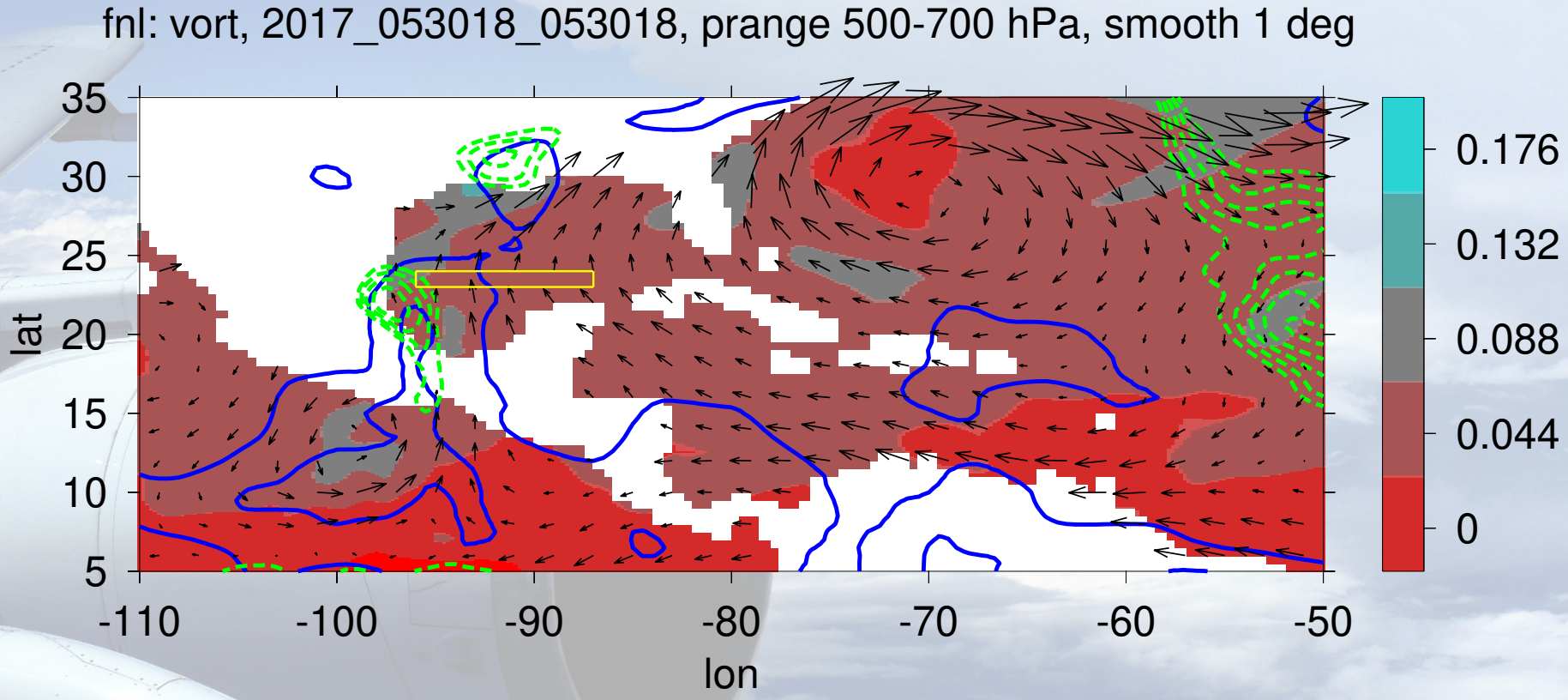
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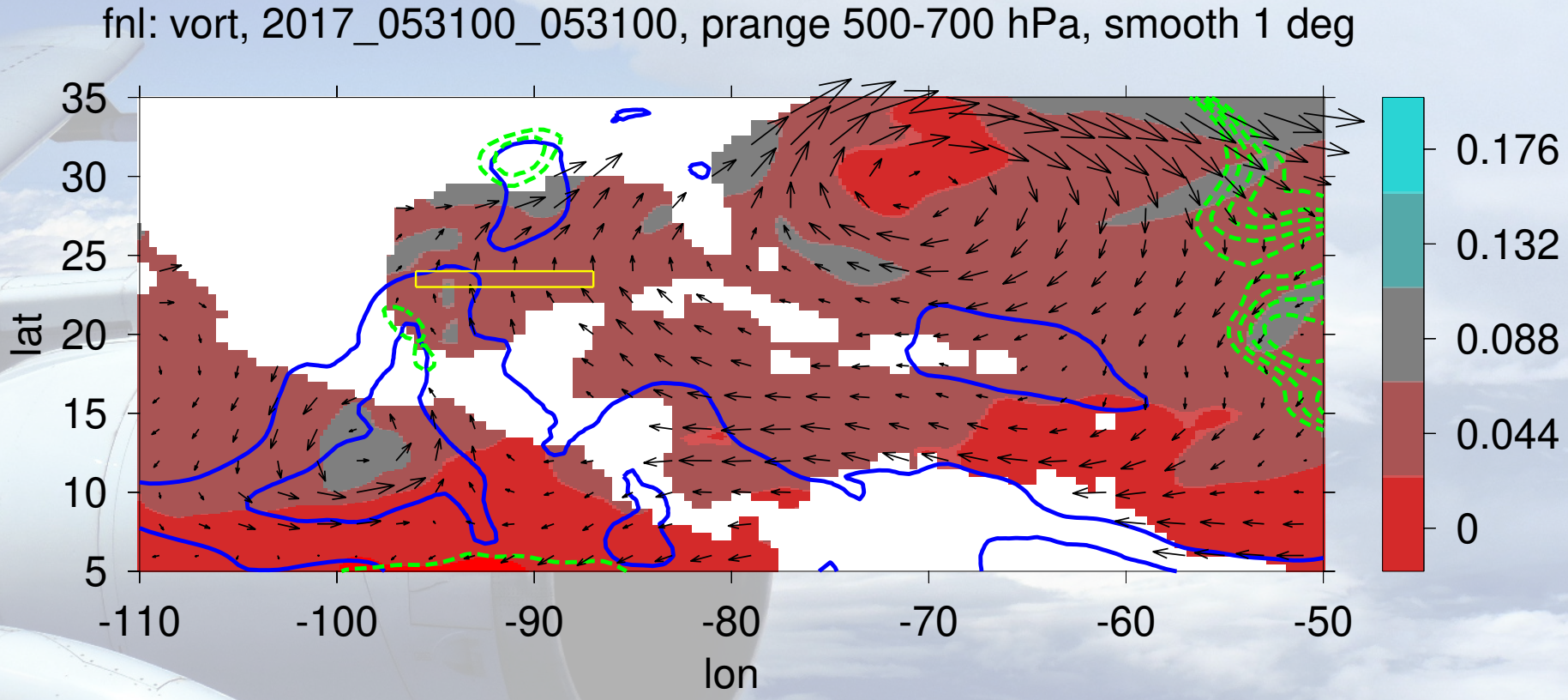
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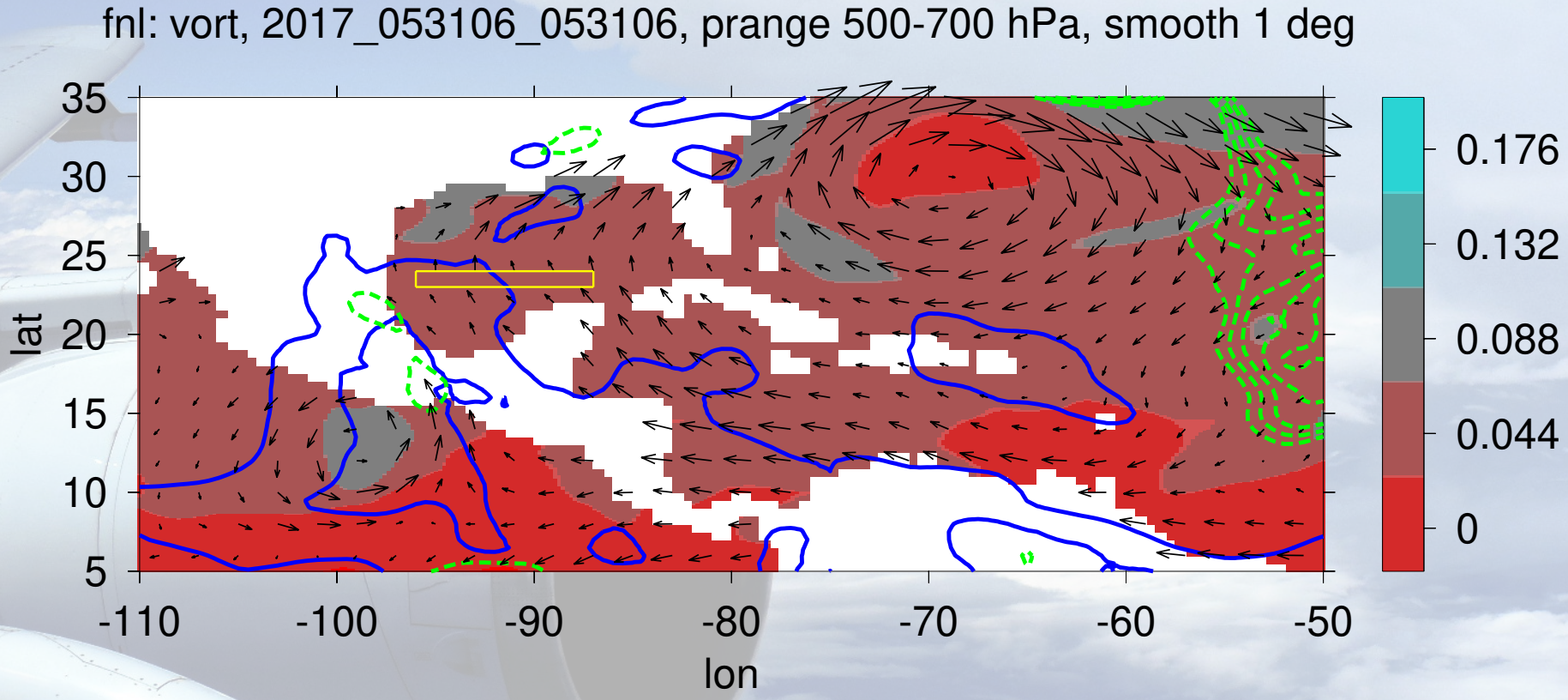
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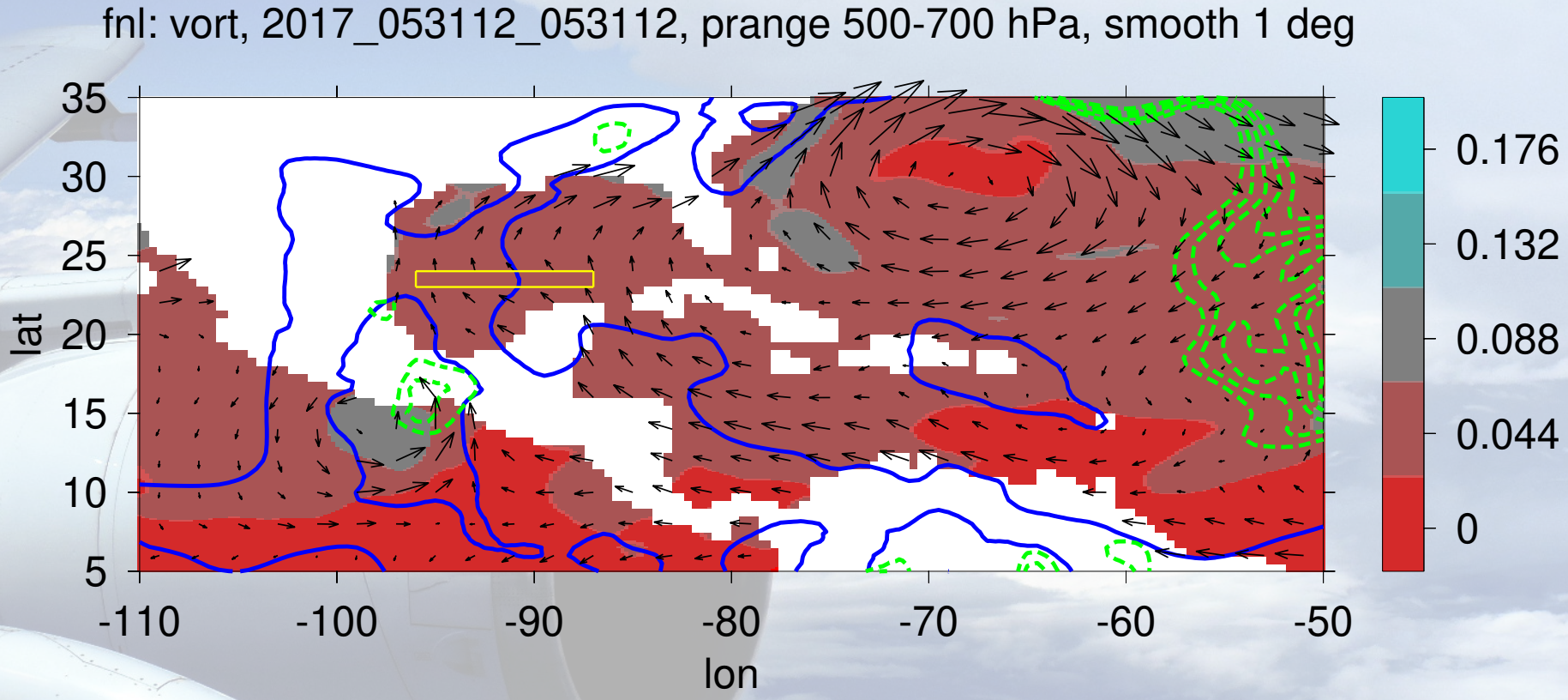
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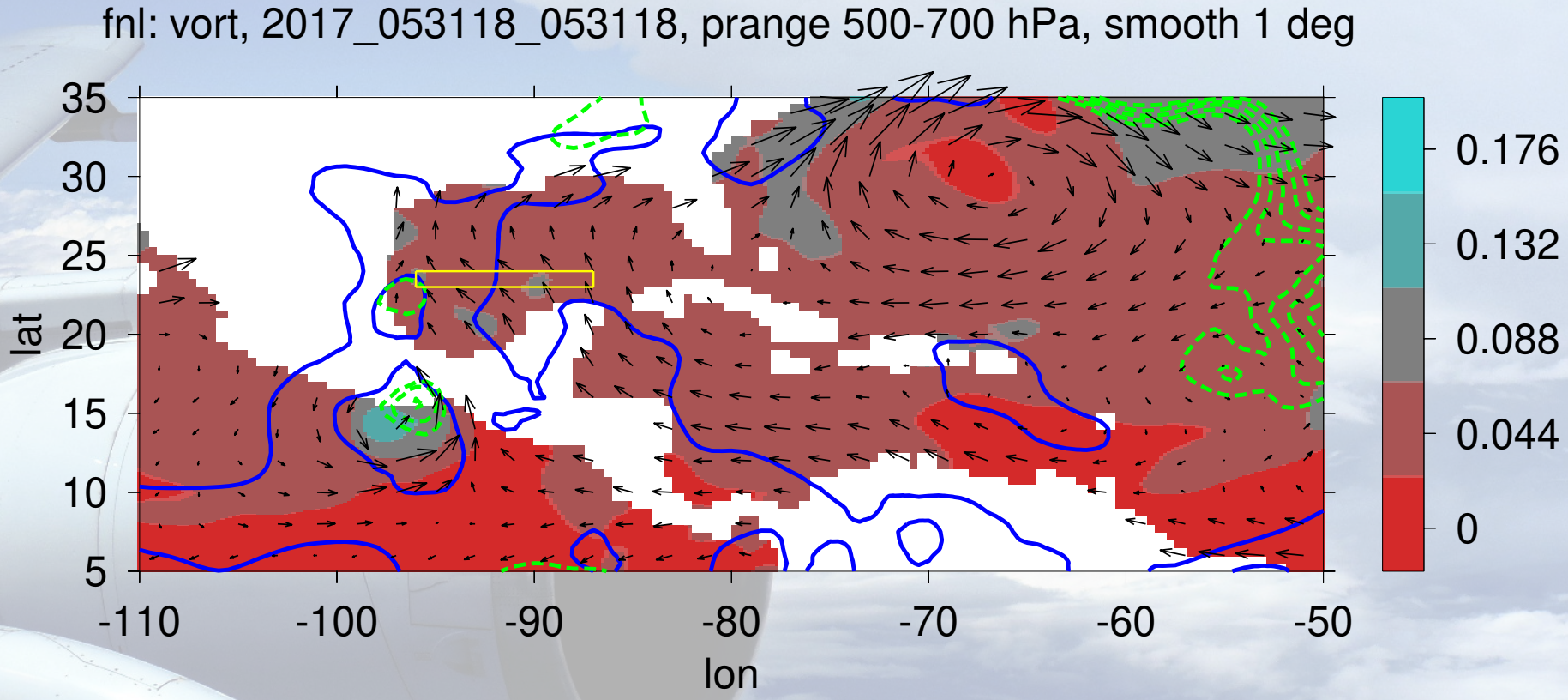
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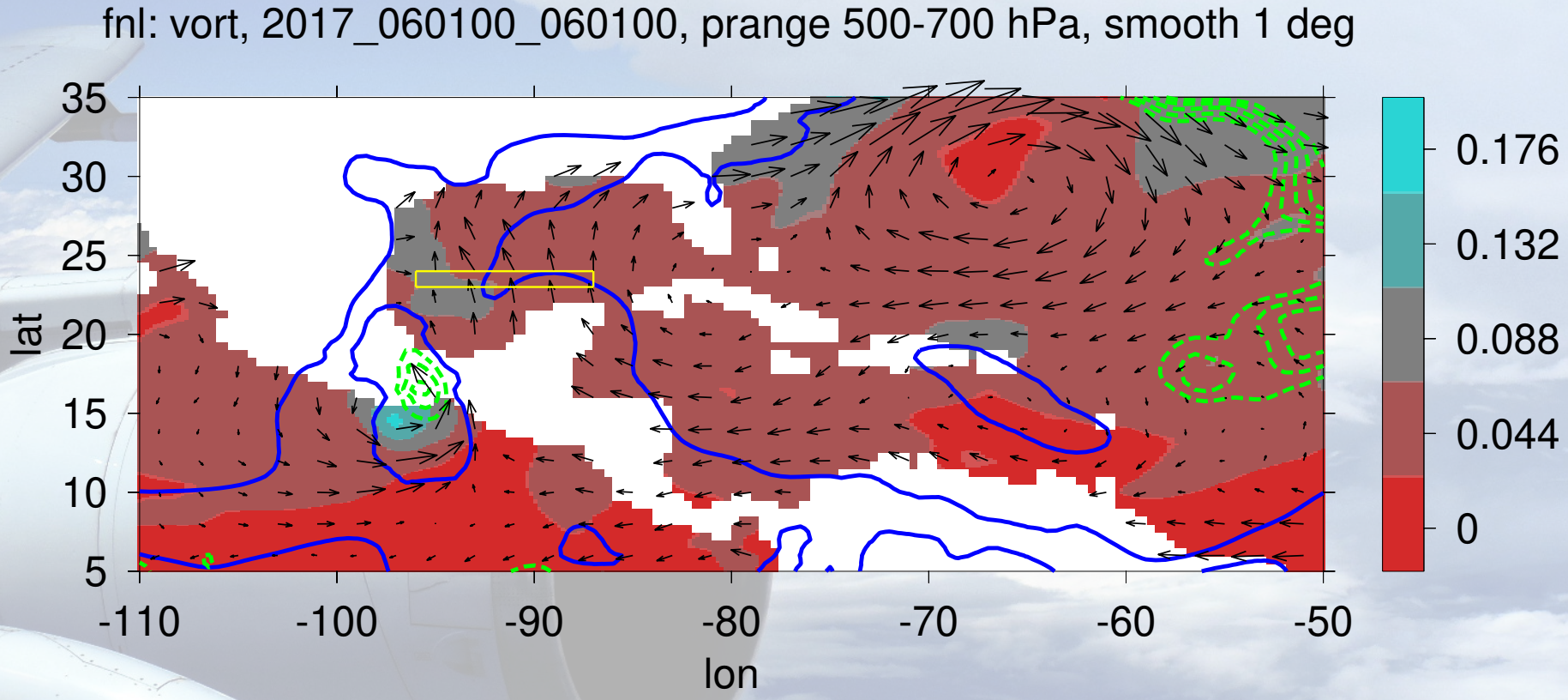
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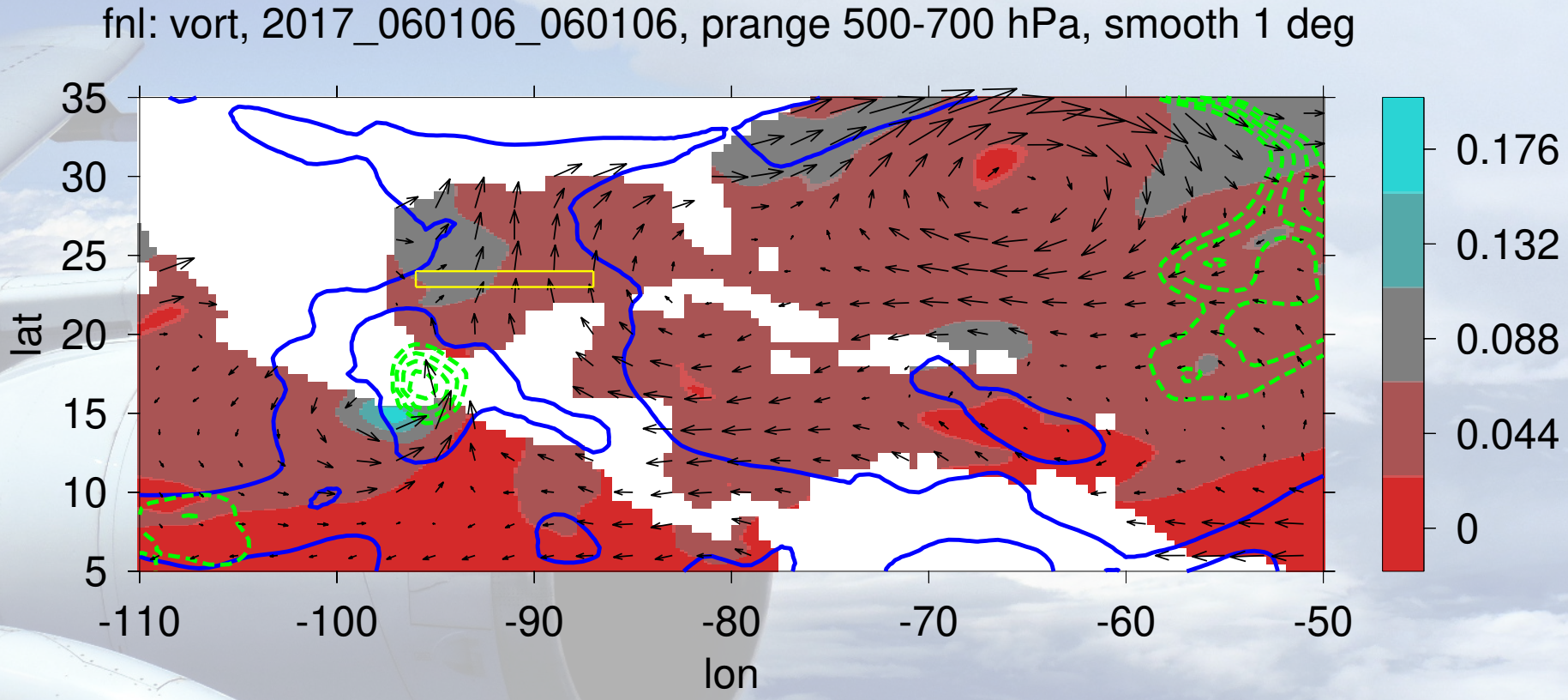
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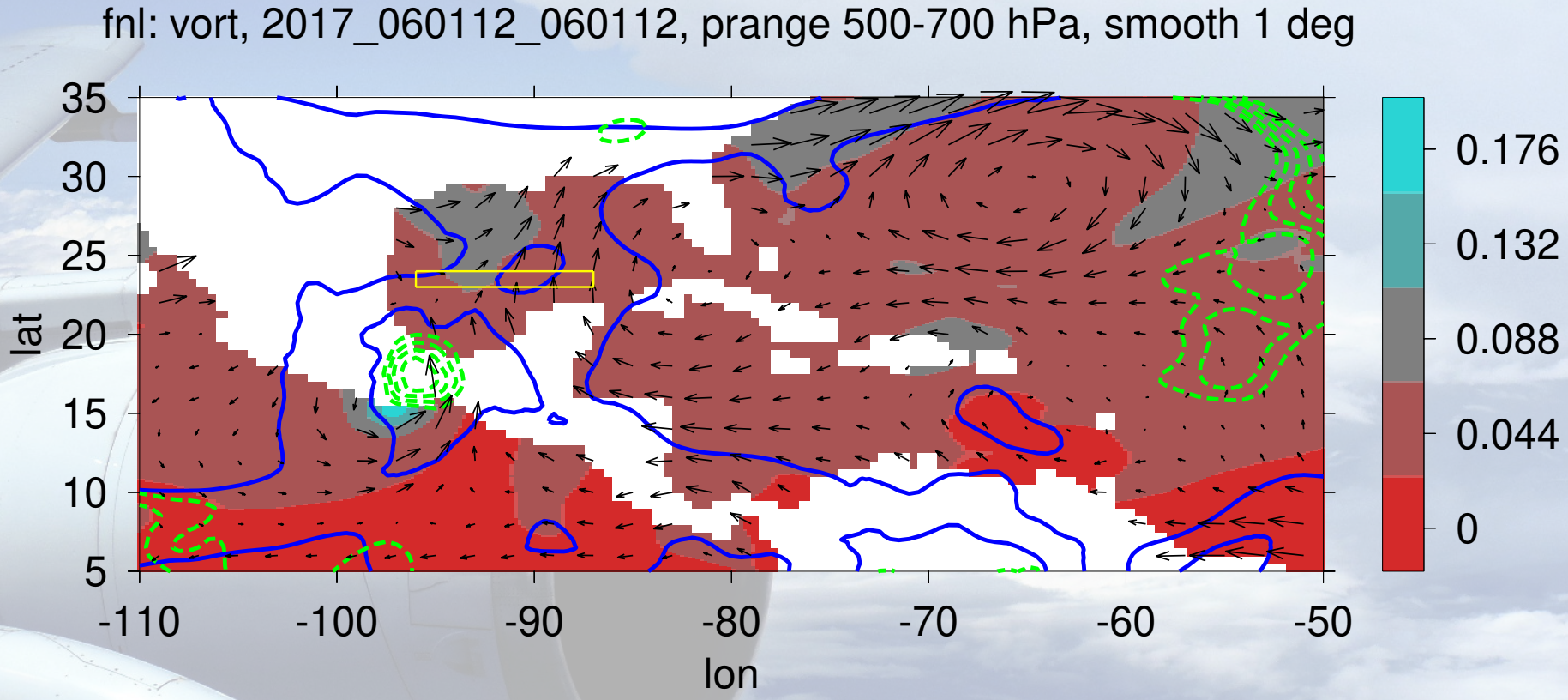
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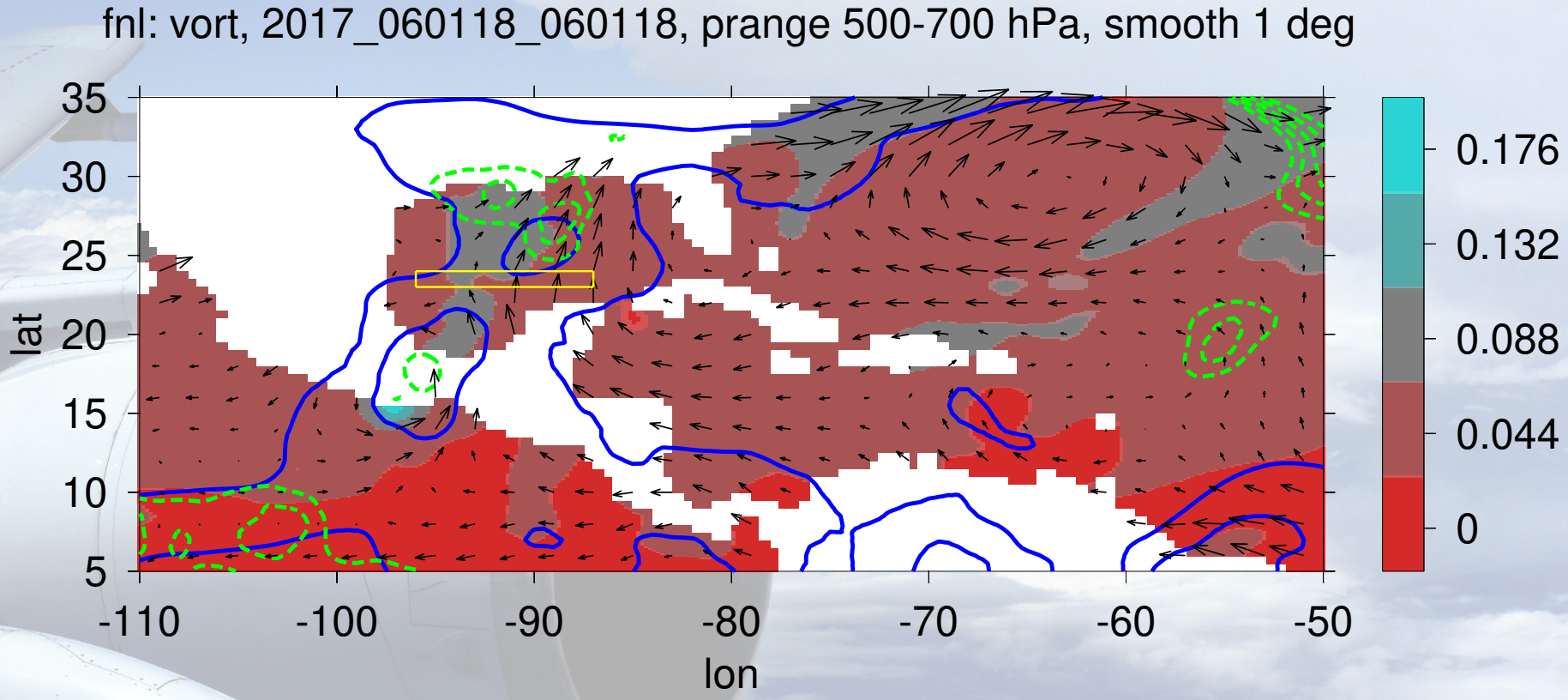
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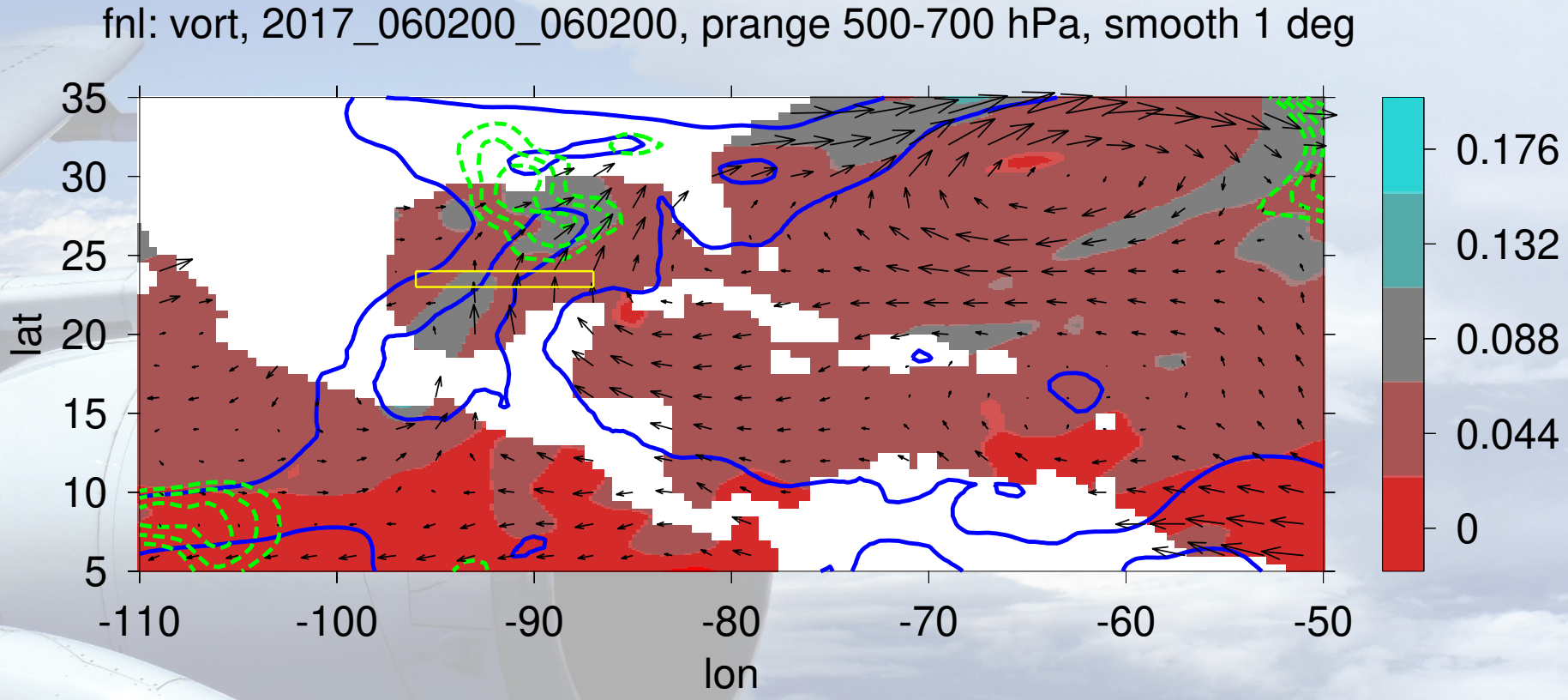
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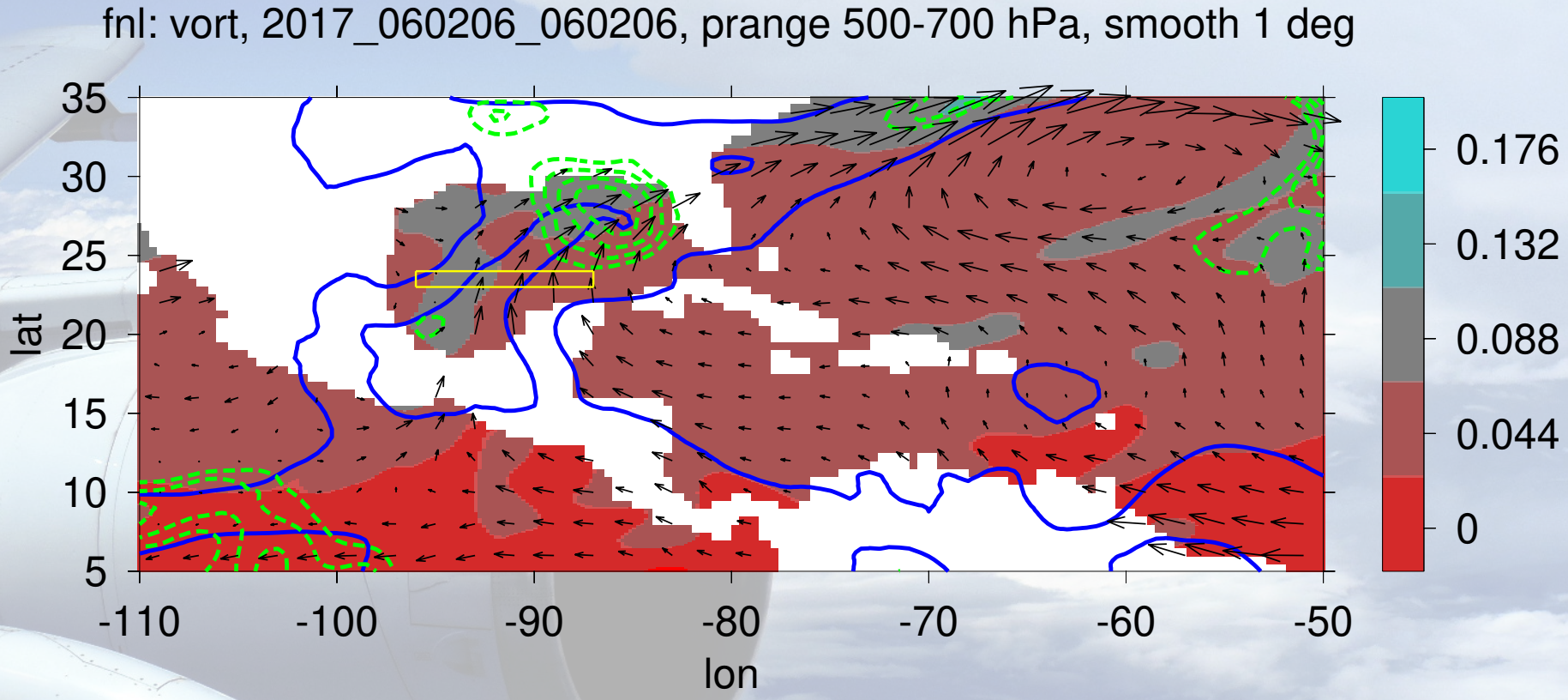
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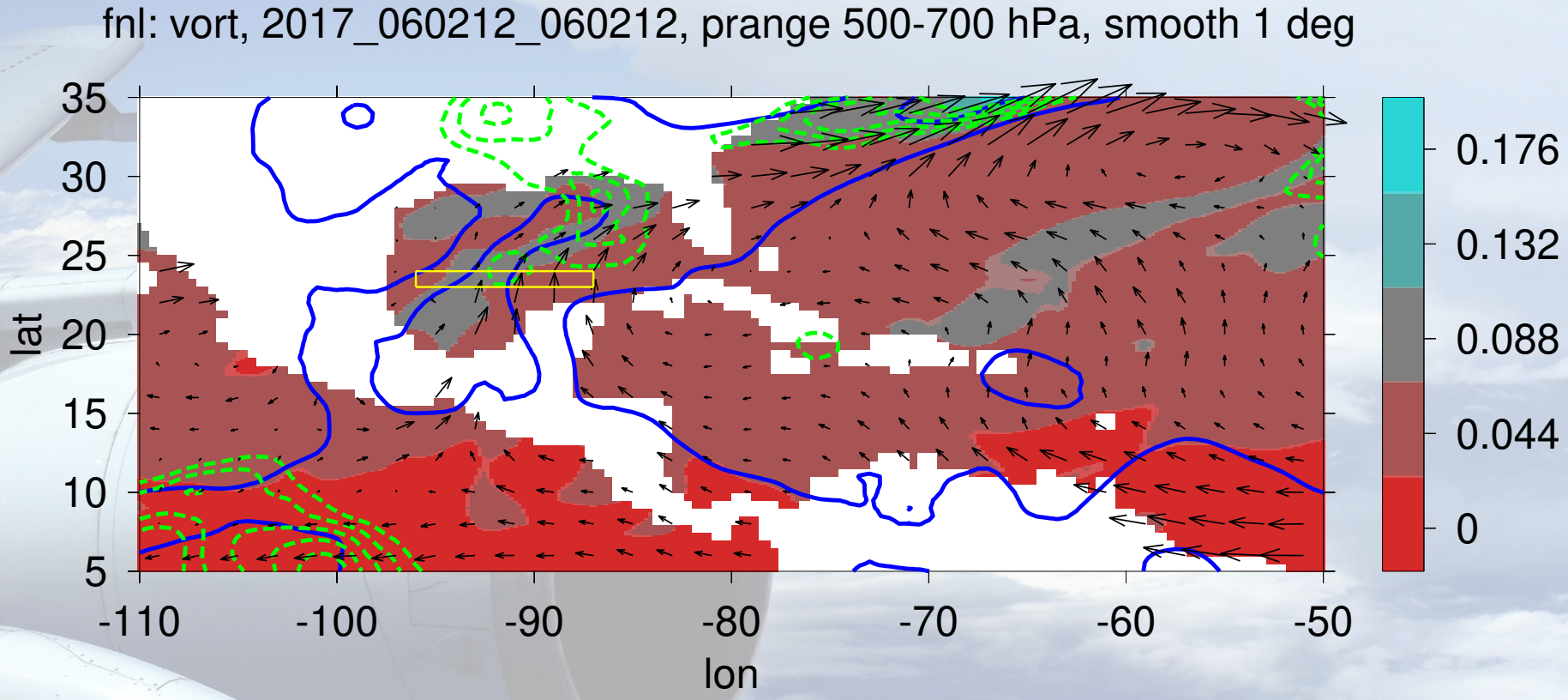
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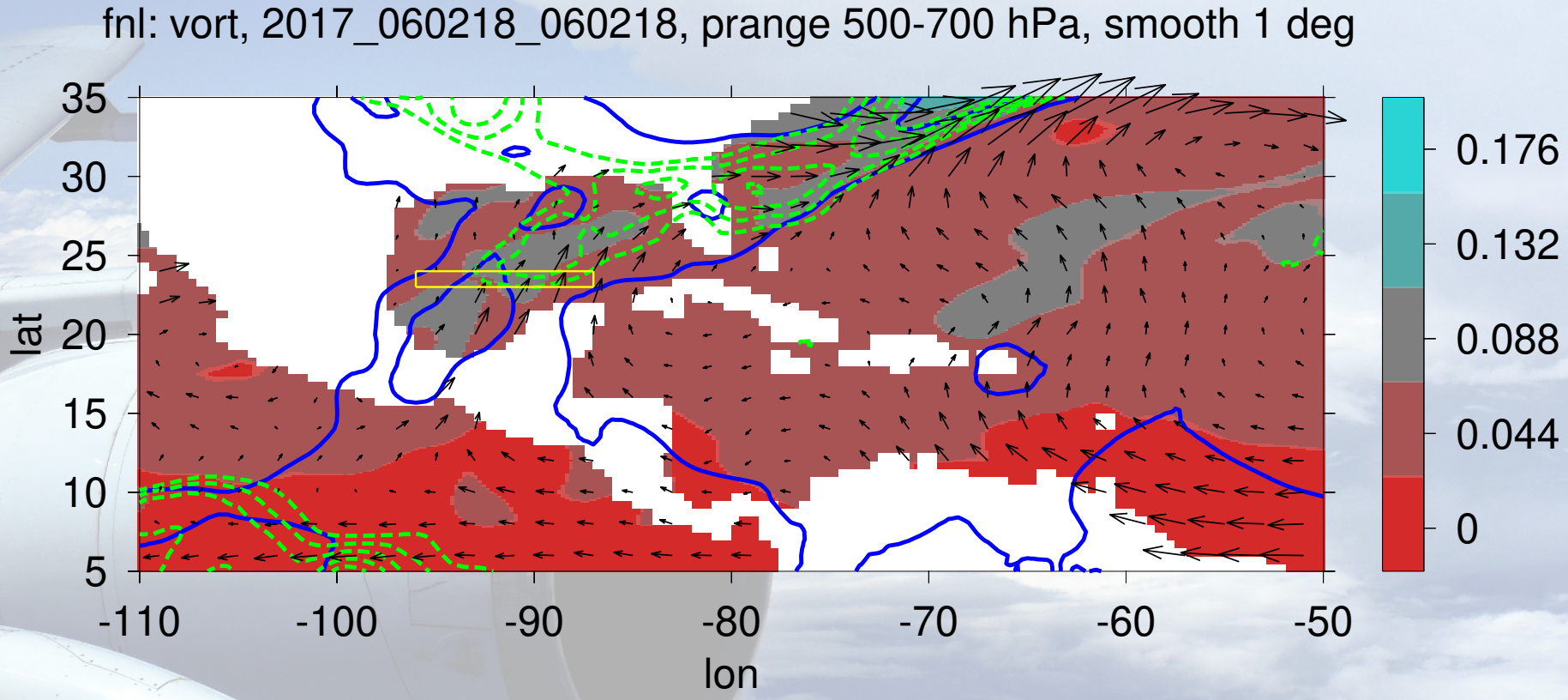
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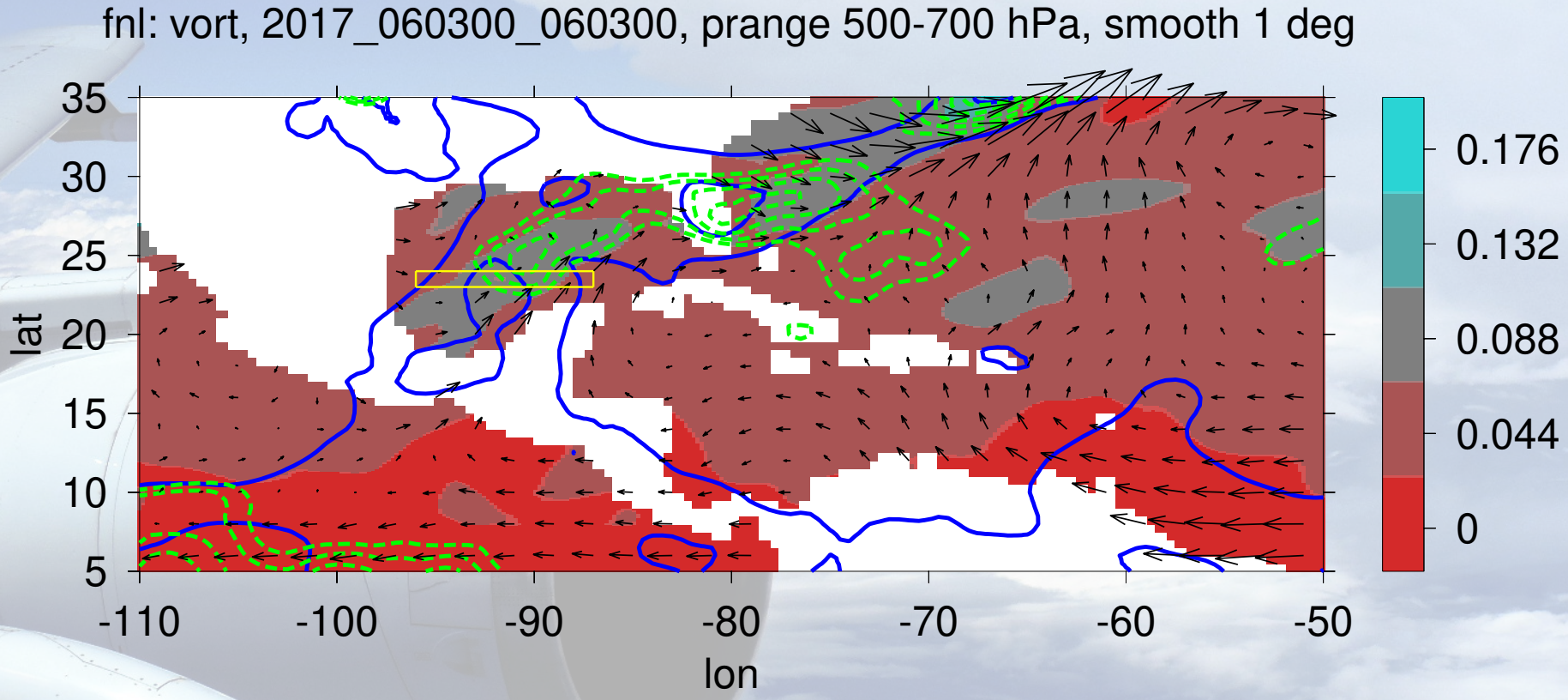
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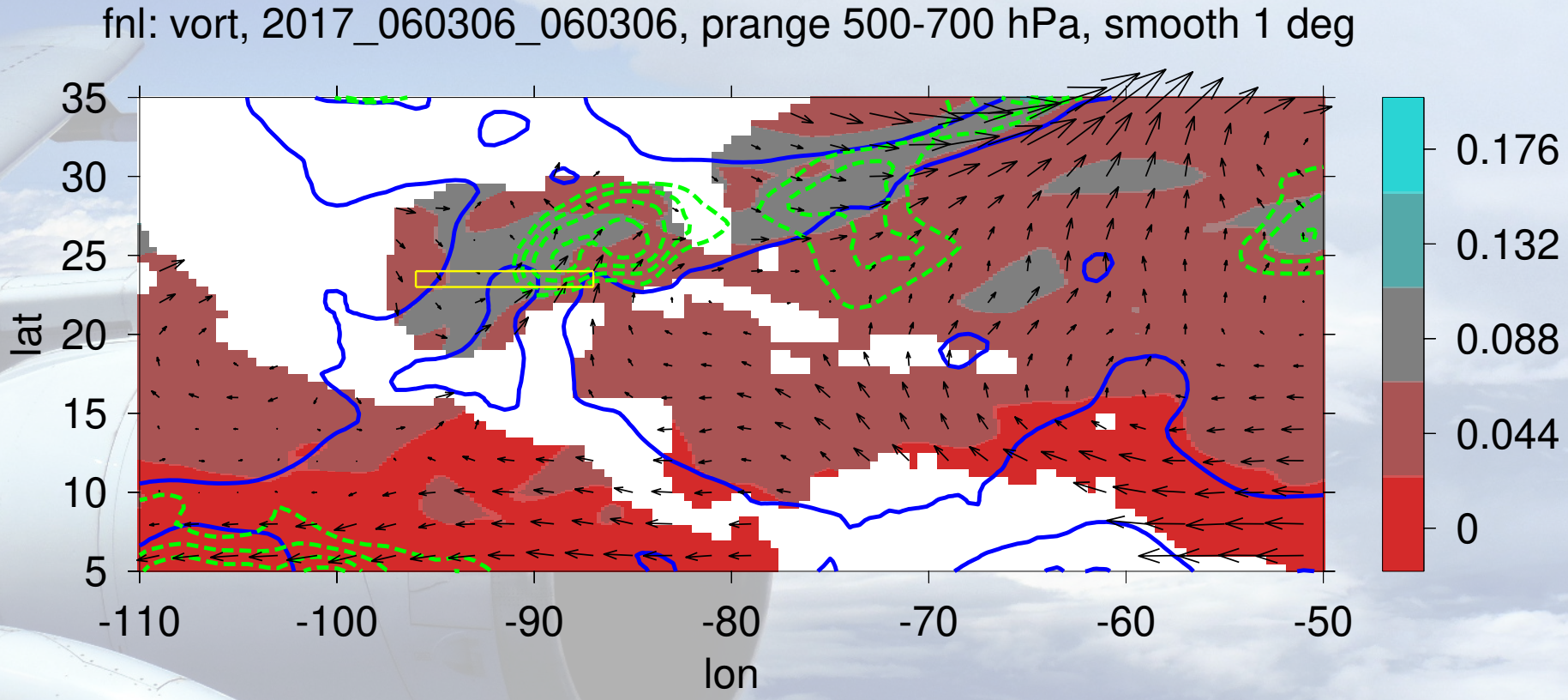
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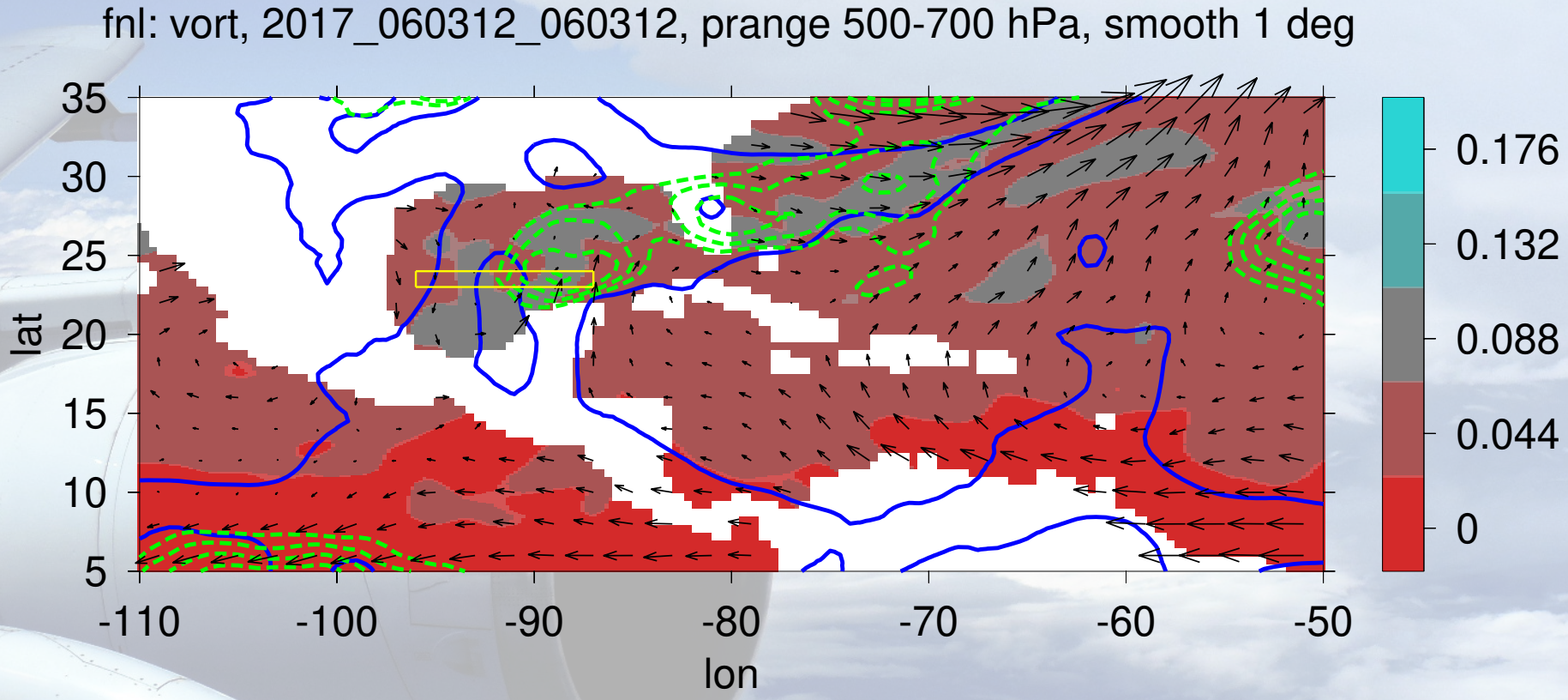
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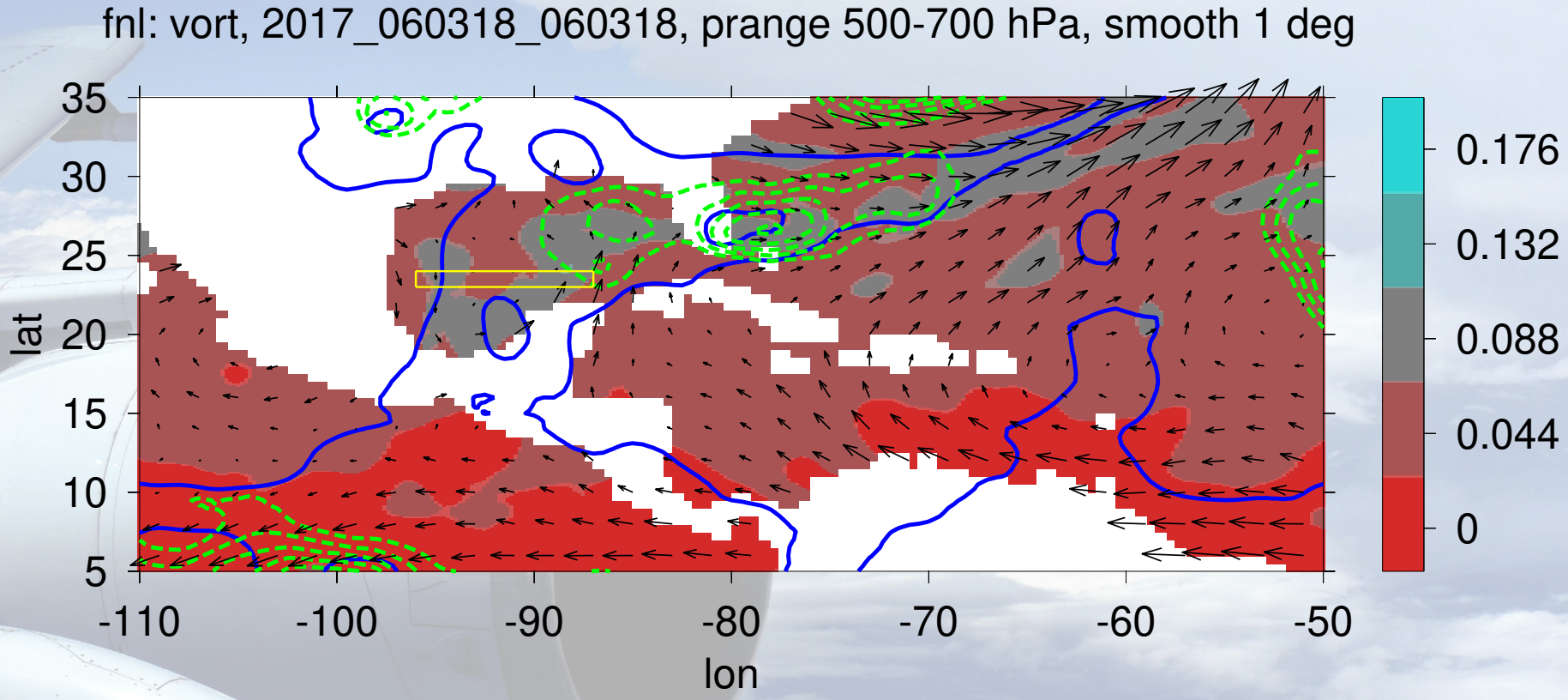
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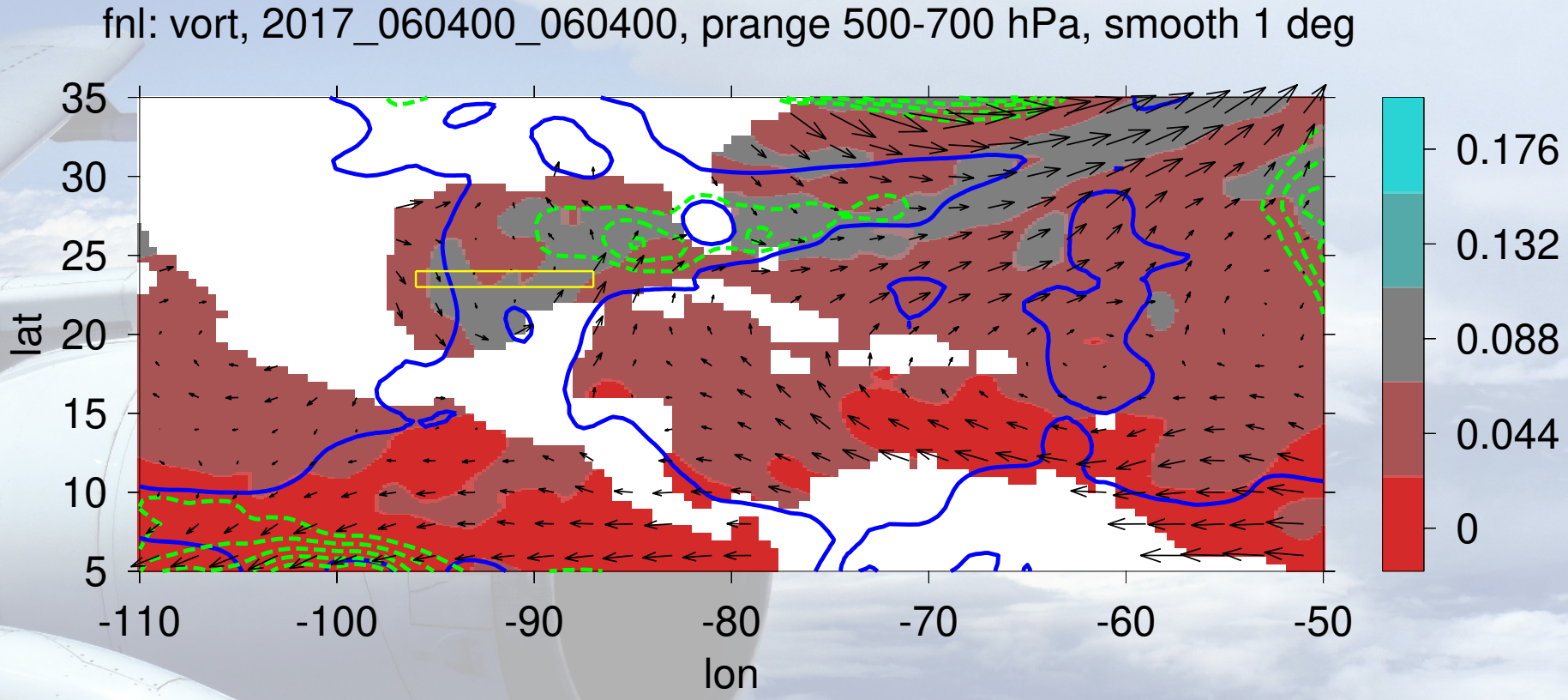
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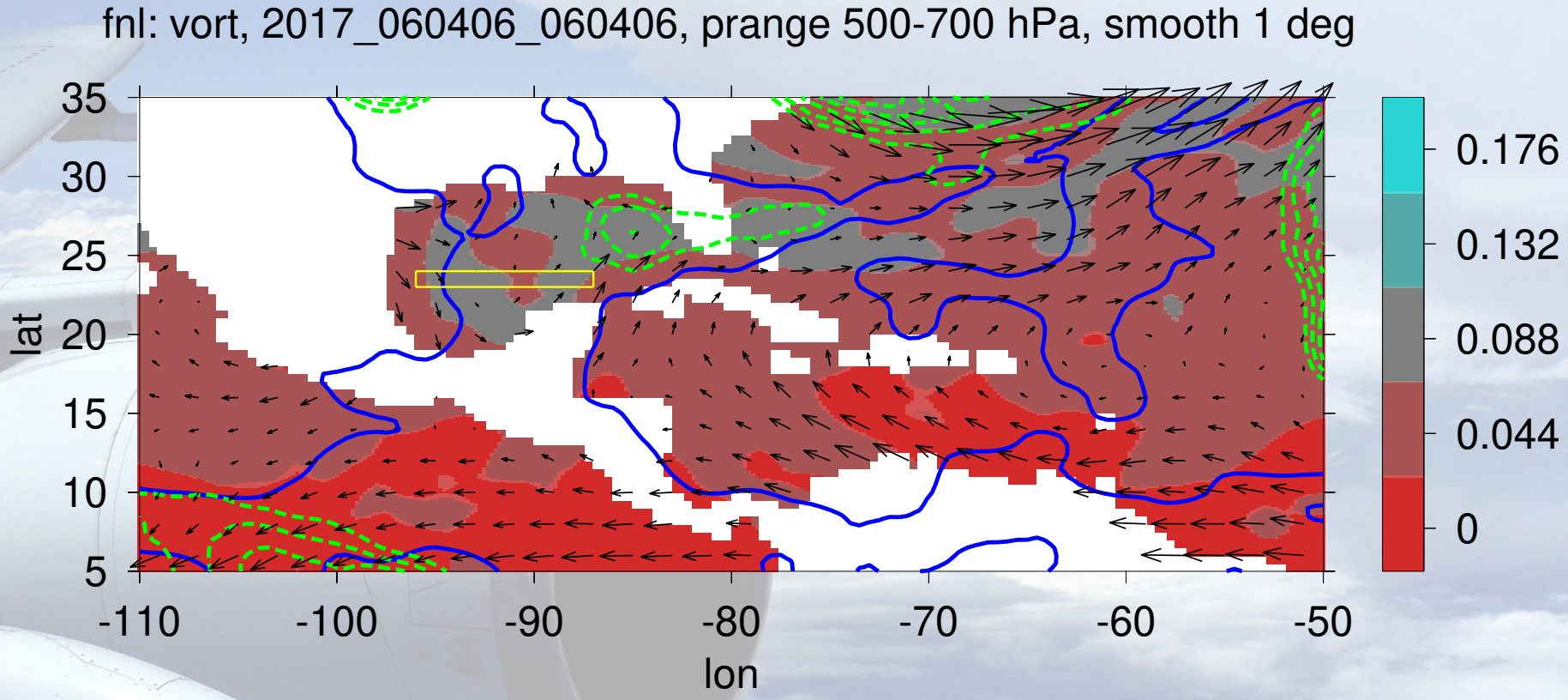
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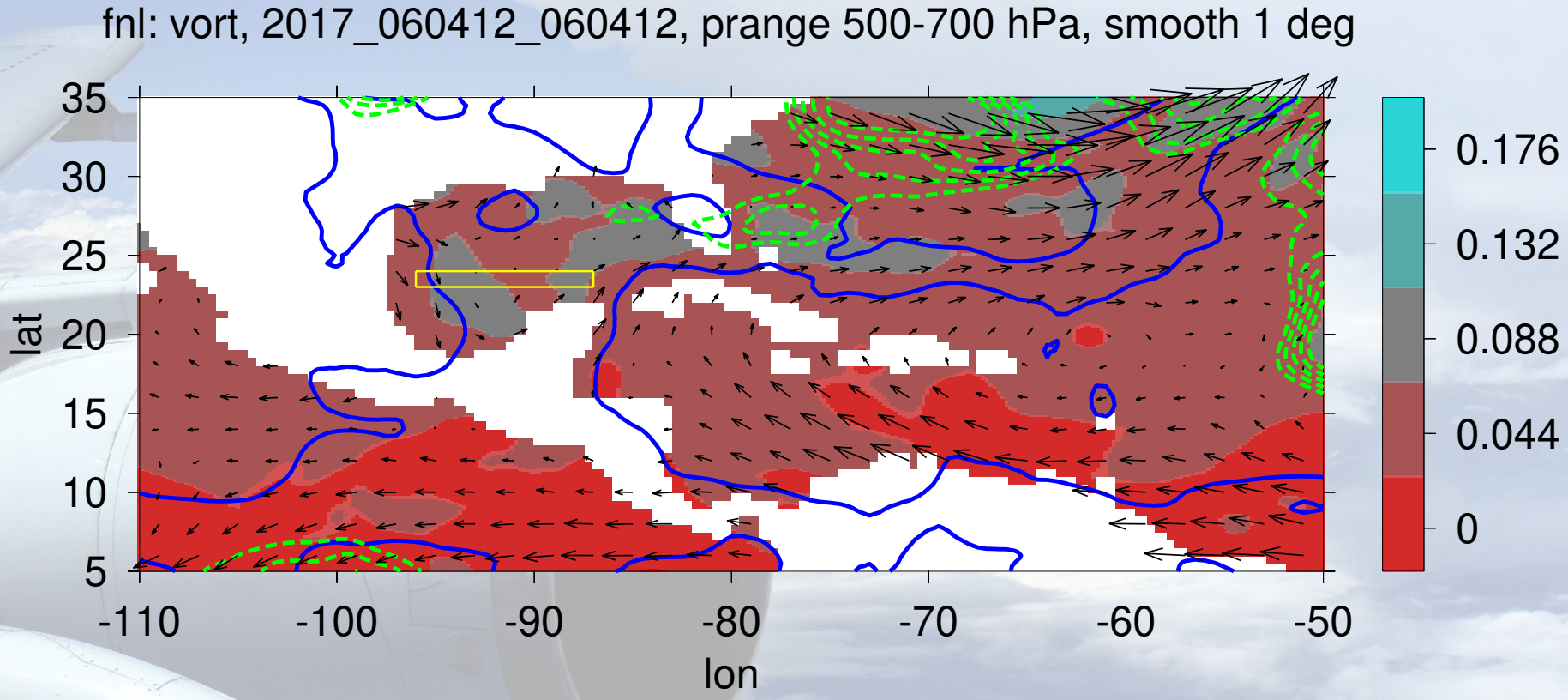
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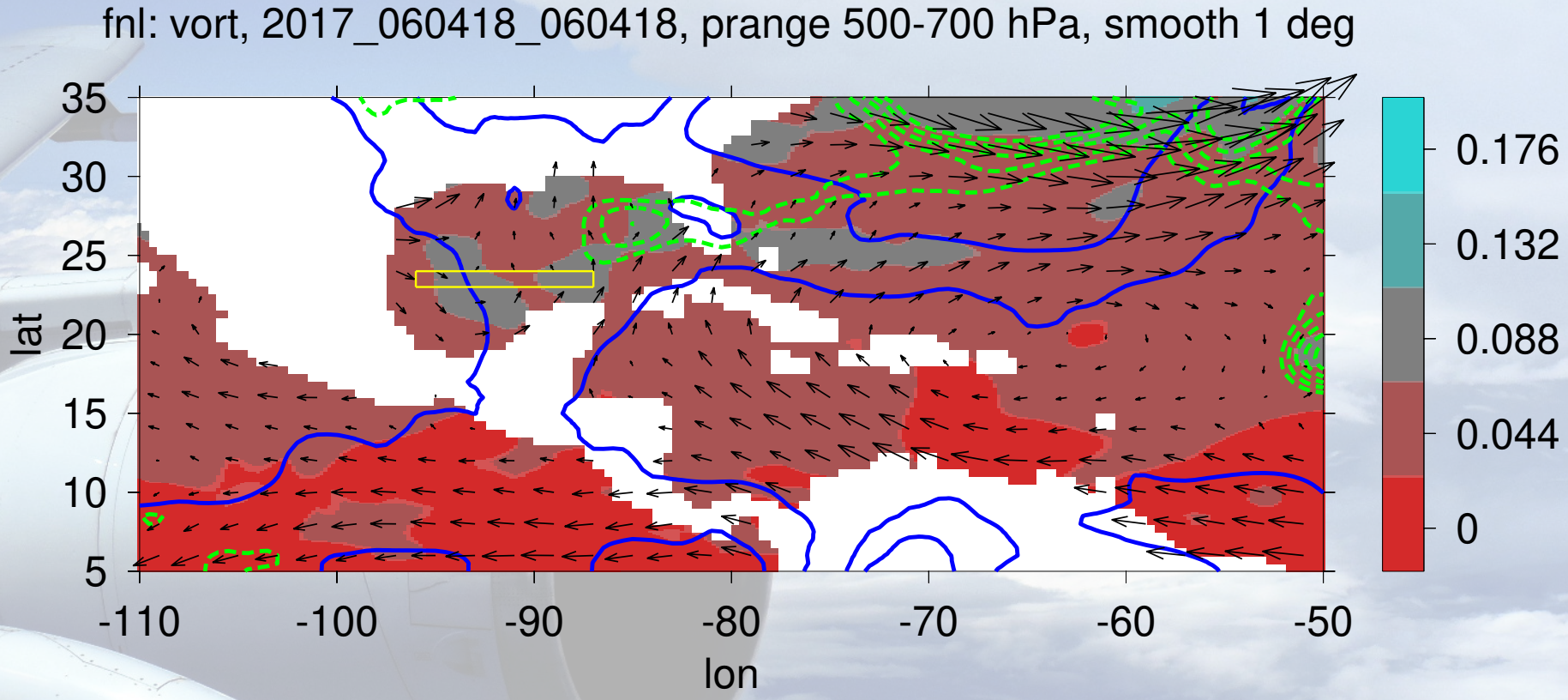
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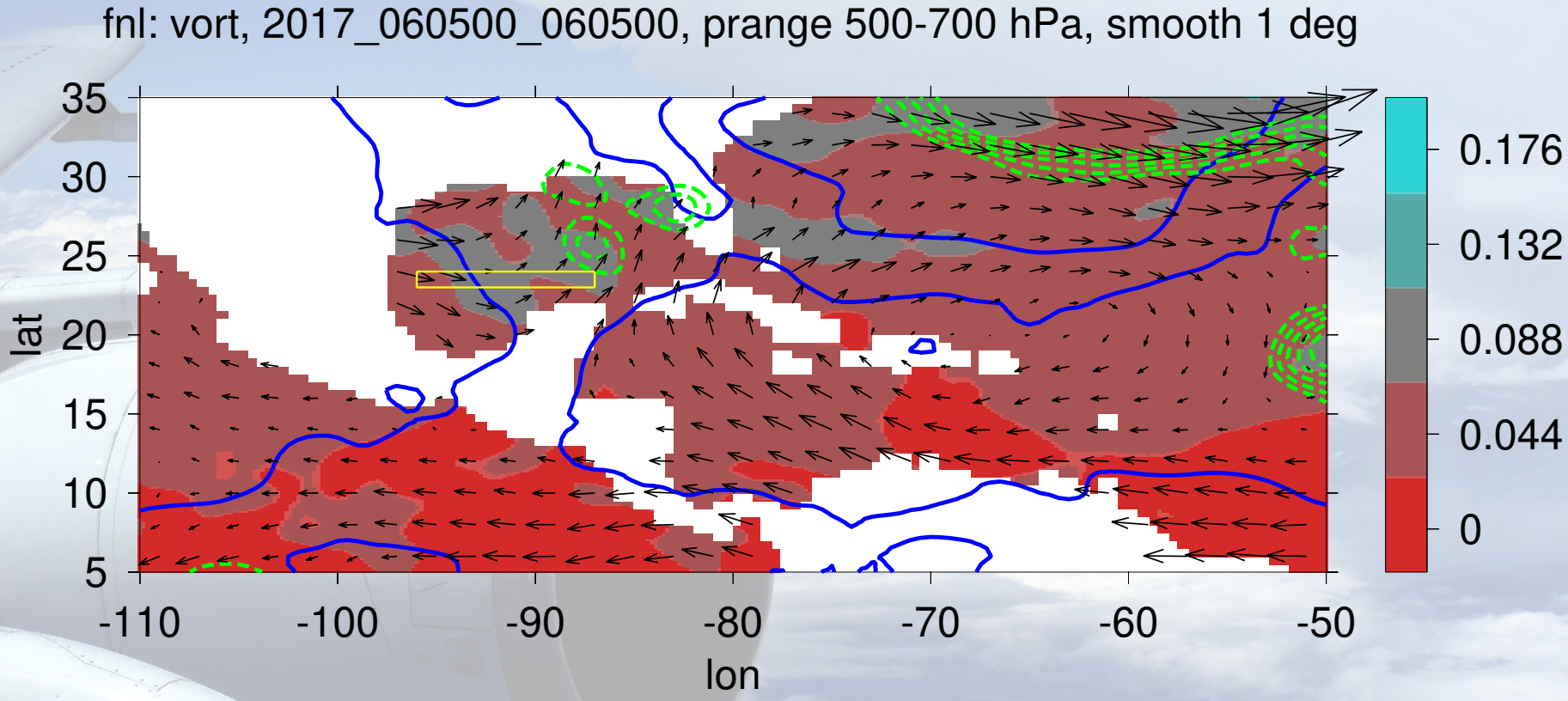
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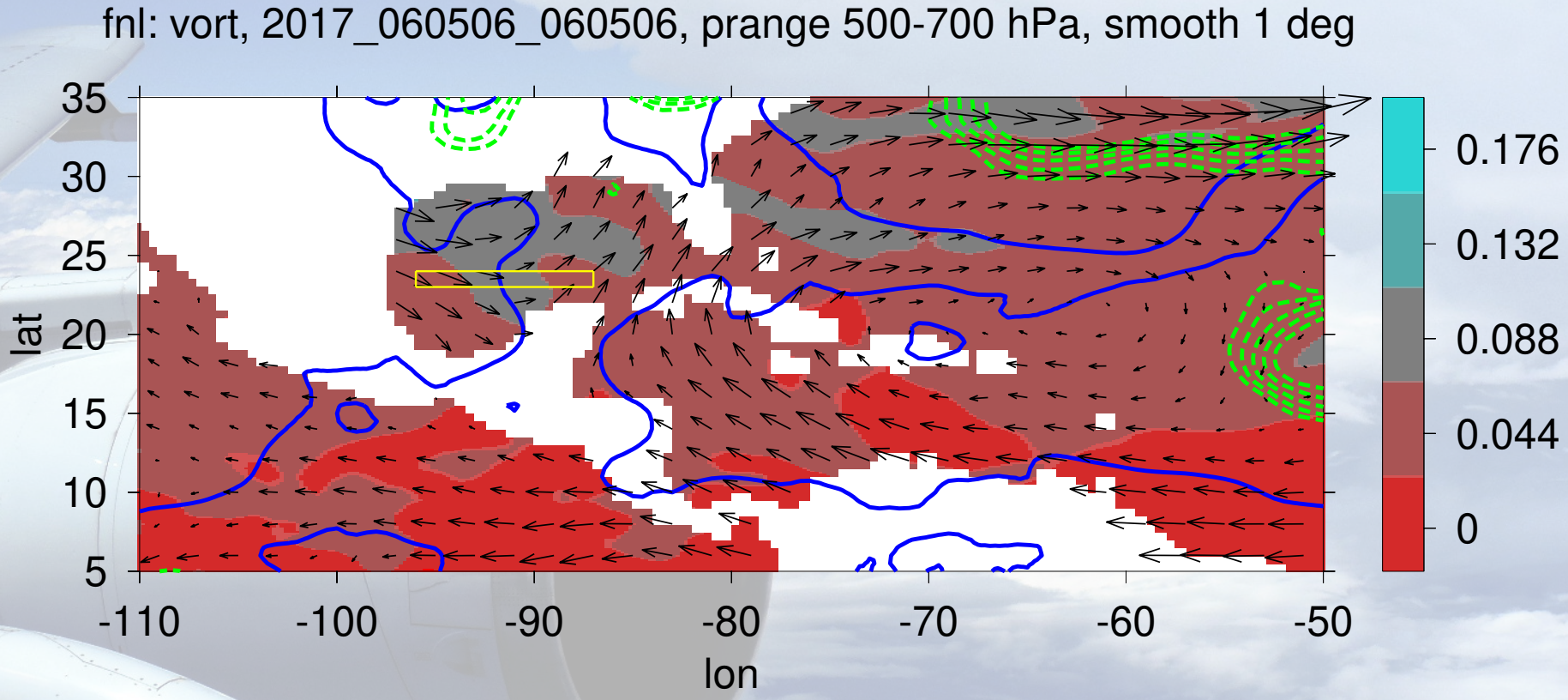
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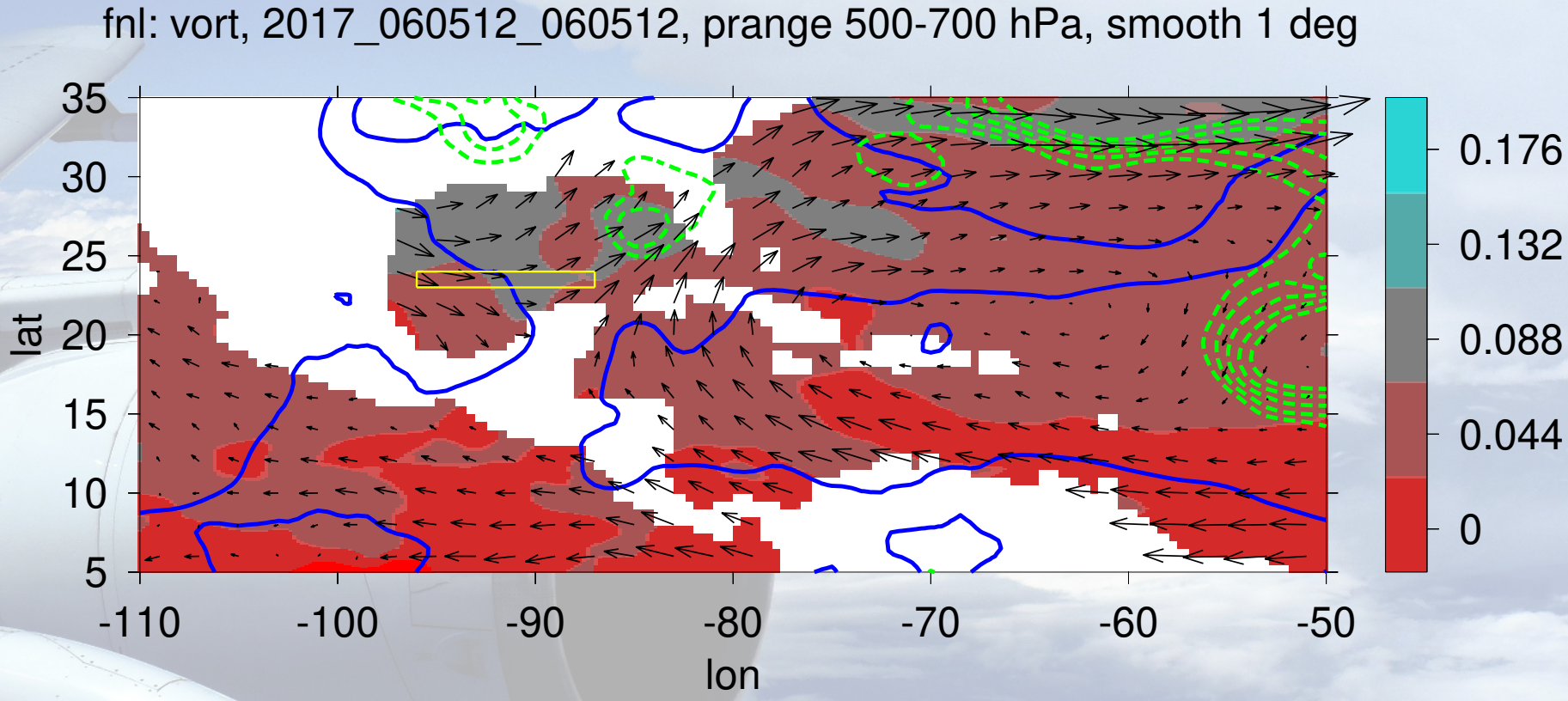
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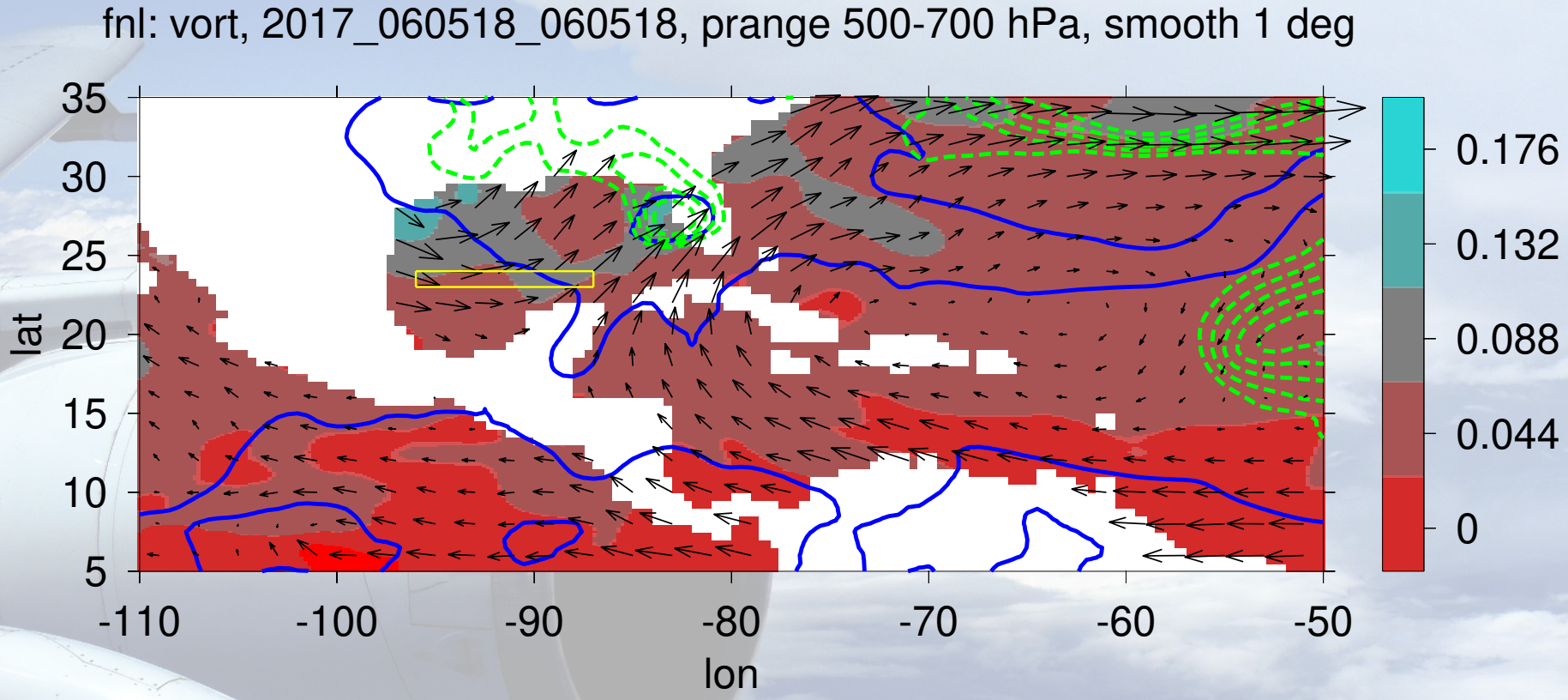
fnl: vort, 2017_060518_060518, prange 500-700 hPa, smooth 1 deg
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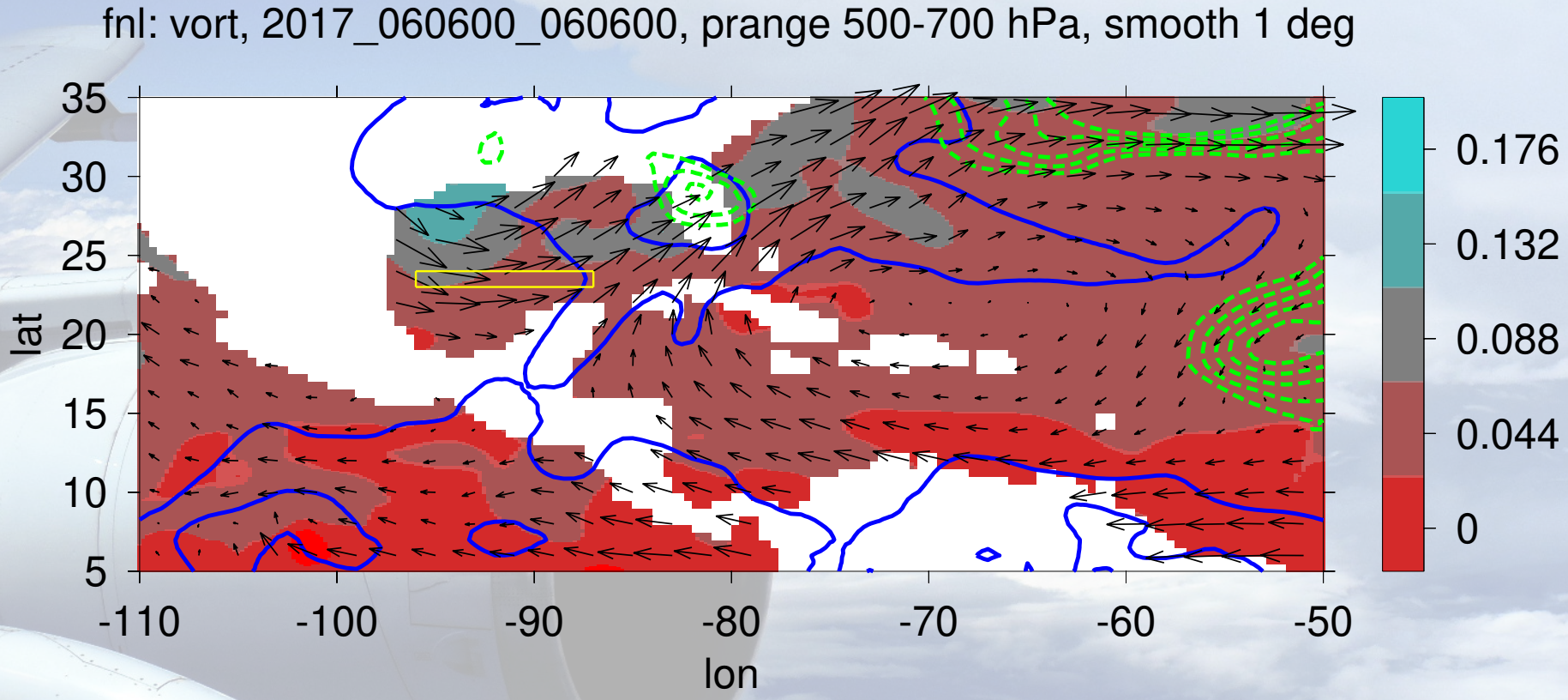
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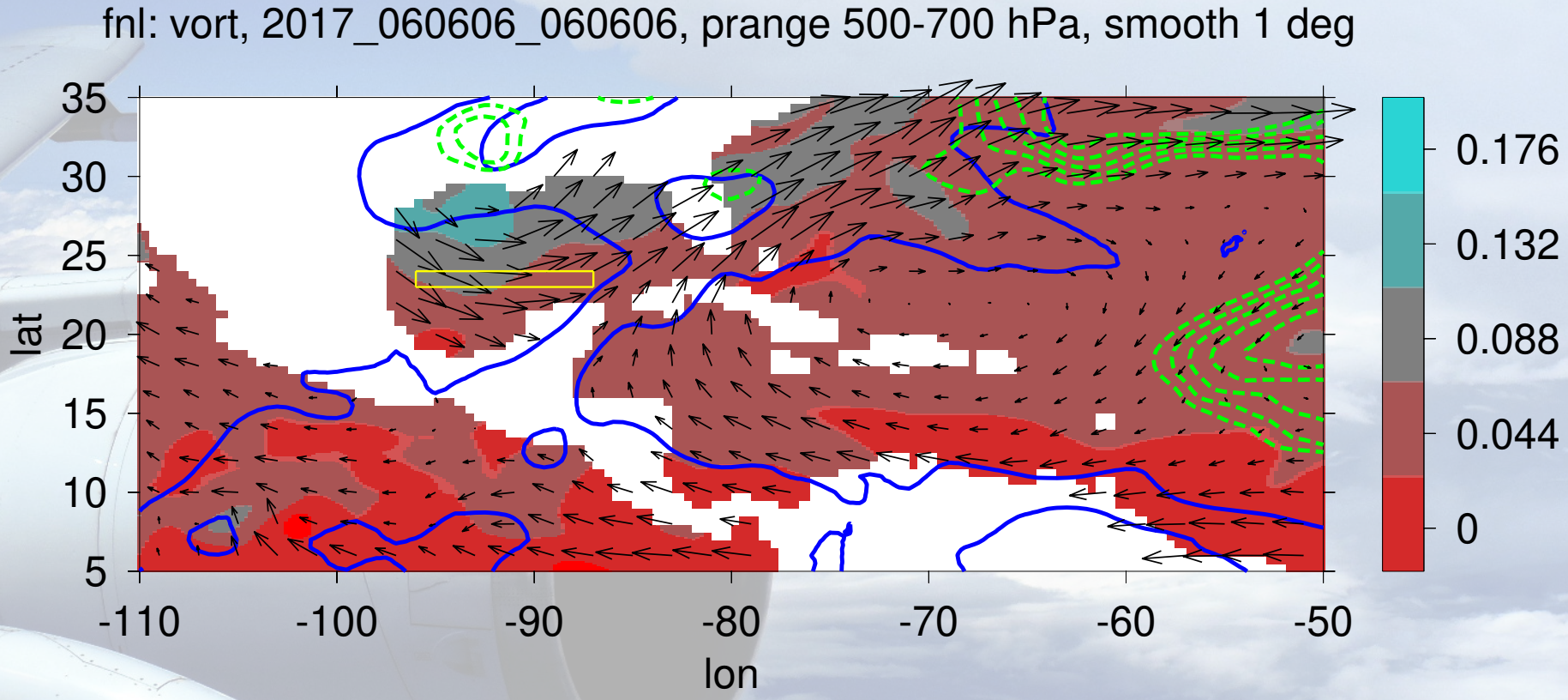
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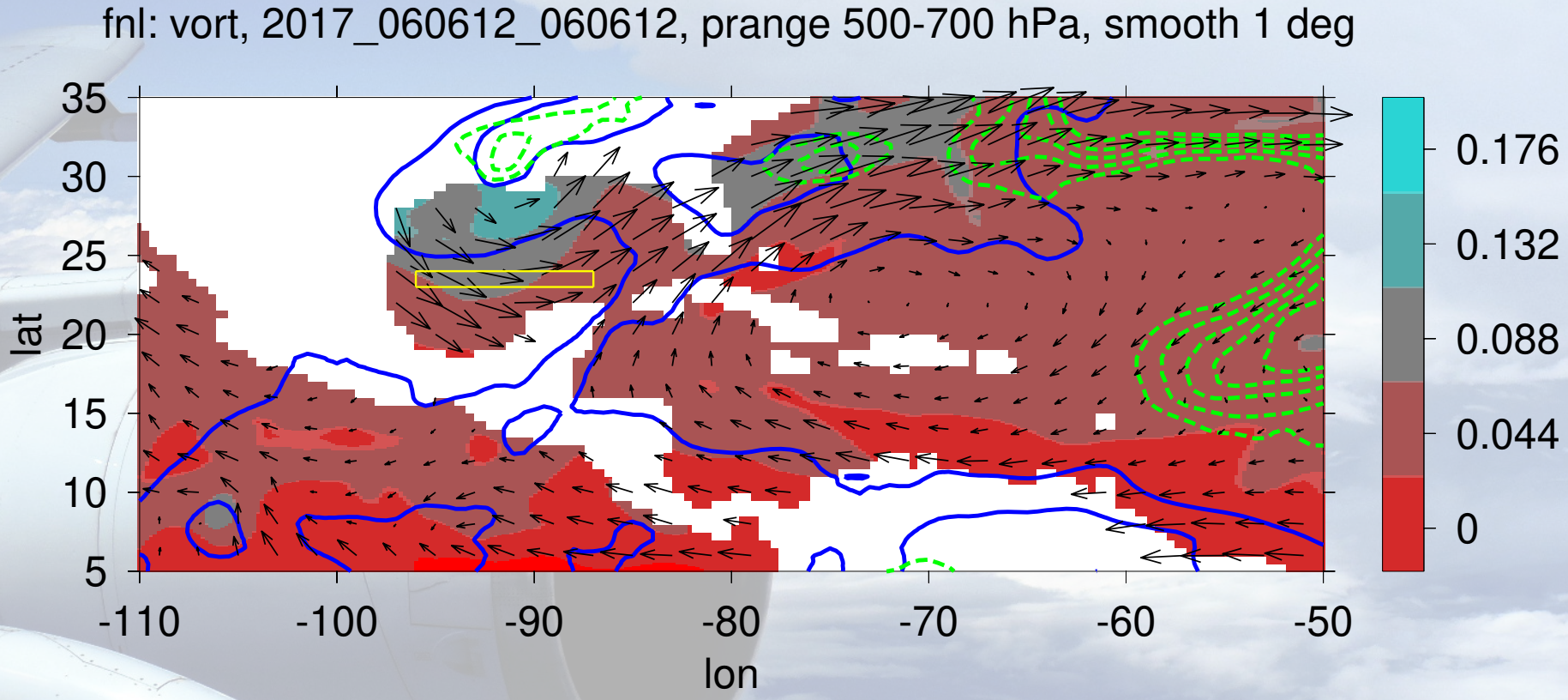
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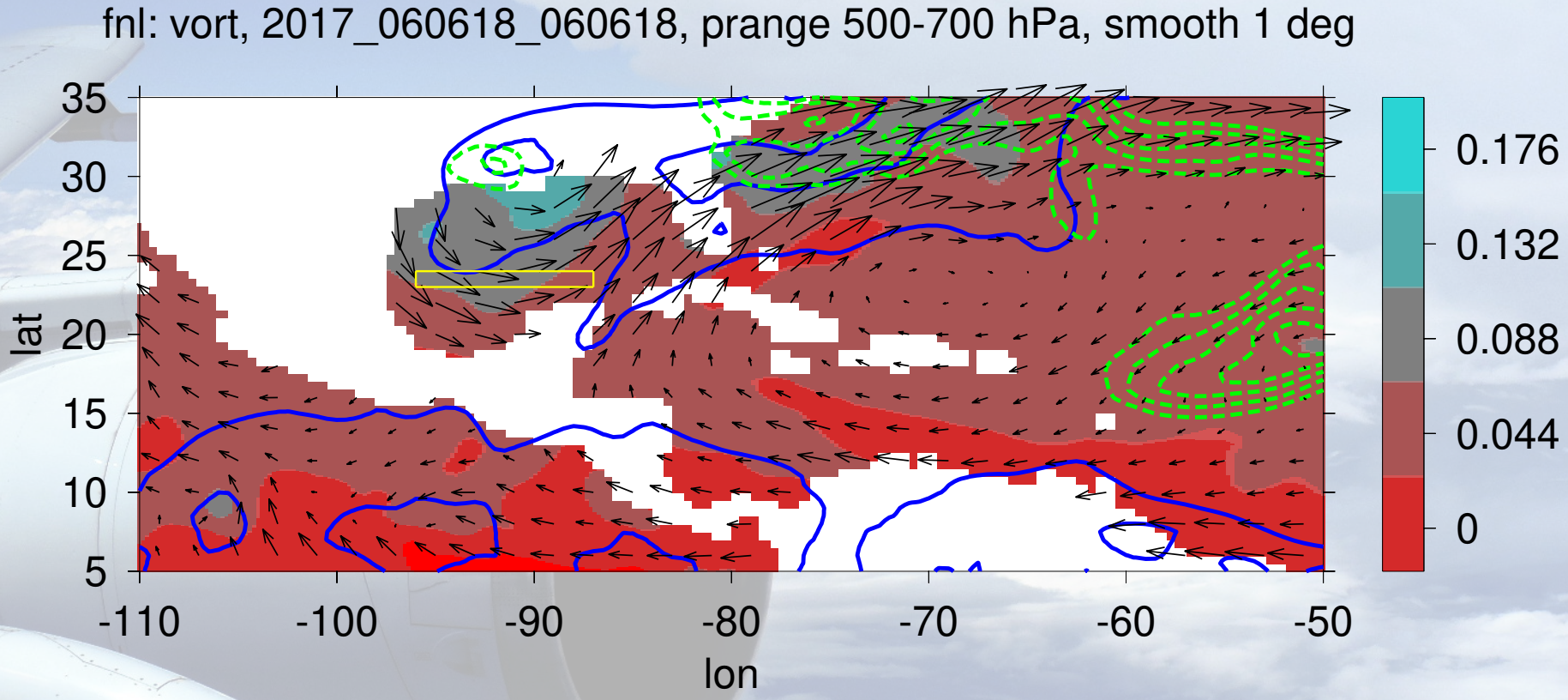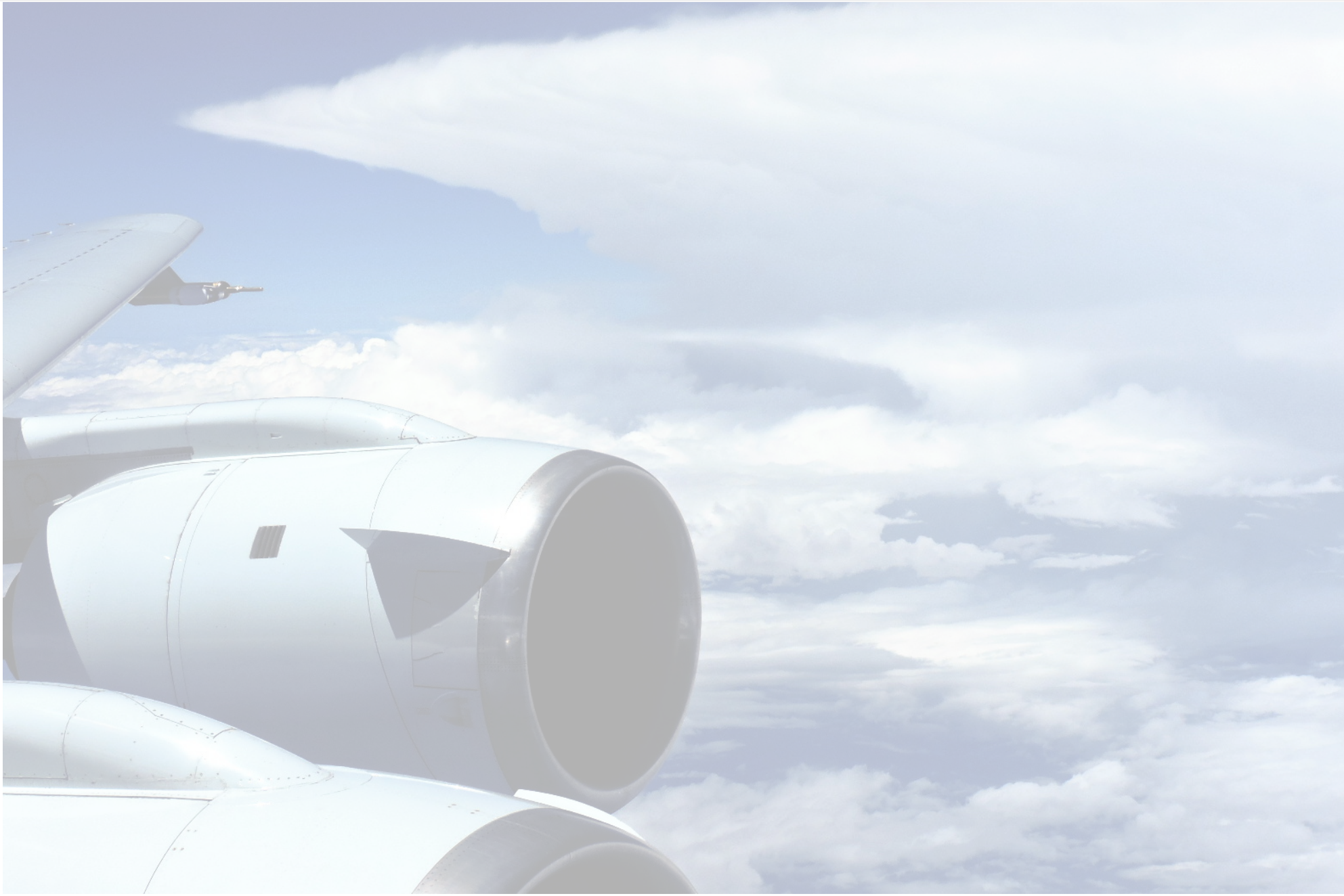
fnl: vort, 2017_060618_060618, prange 500-700 hPa, smooth 1 deg
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