Vertical wind response to increased geomagnetic activity derived from GOCE linear and angular accelerations

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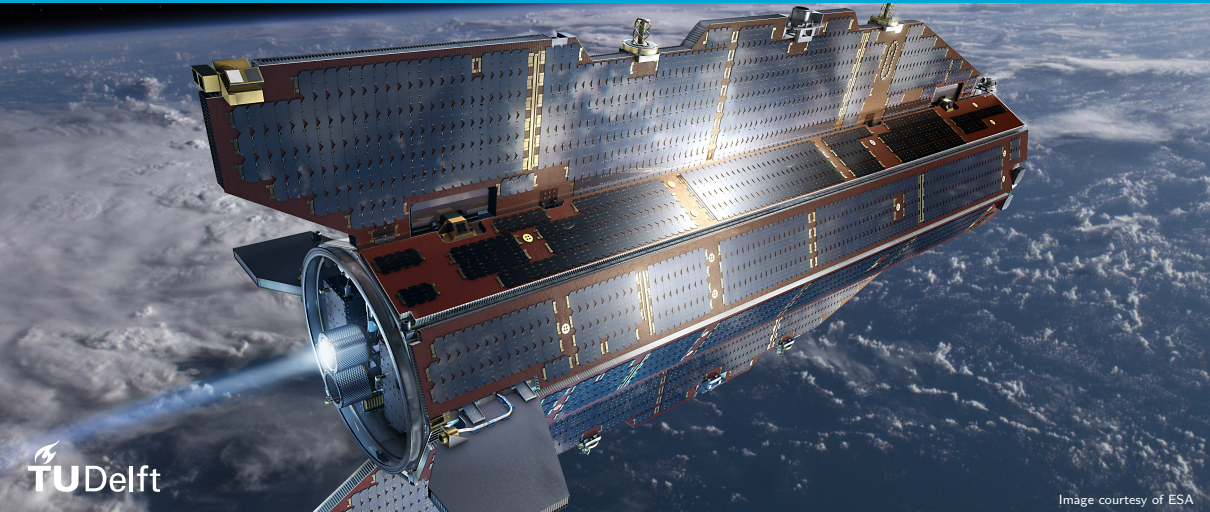
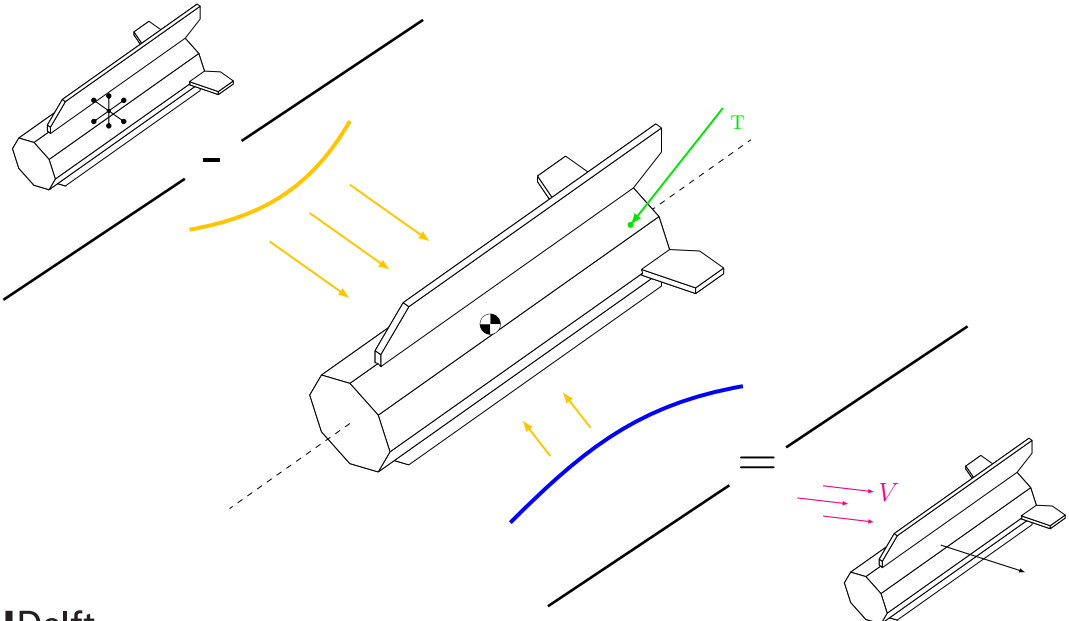
Delft University of Technology
EGU session ST3.5/EMRP4.33/G4.4, Vienna, Austria; 9 April 2018



TU Delft

Image courtesy of ESA



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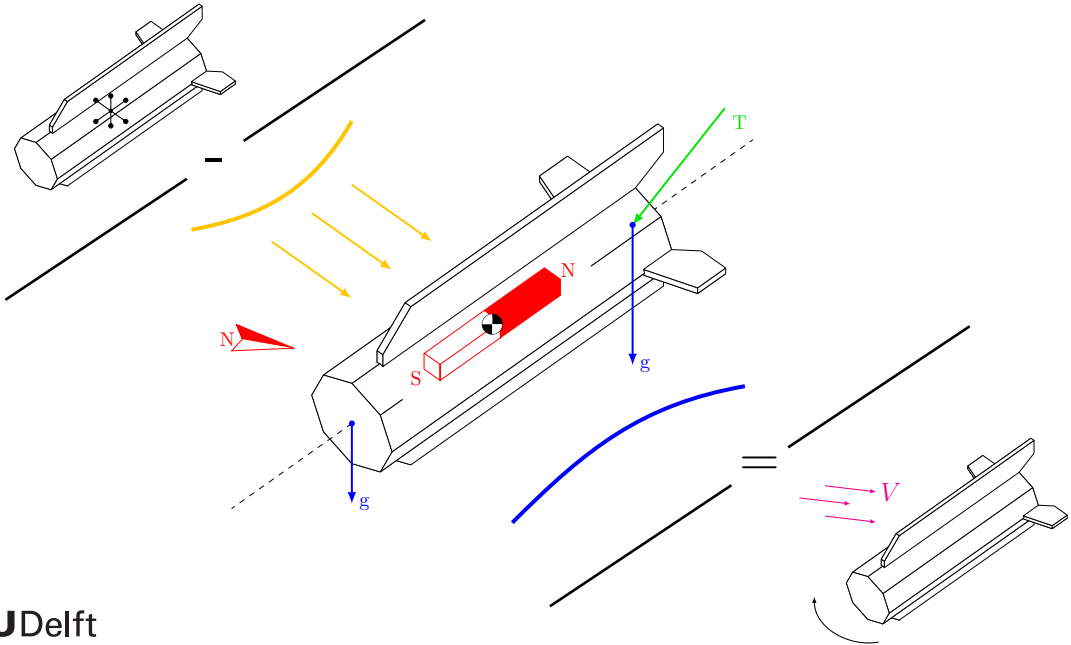
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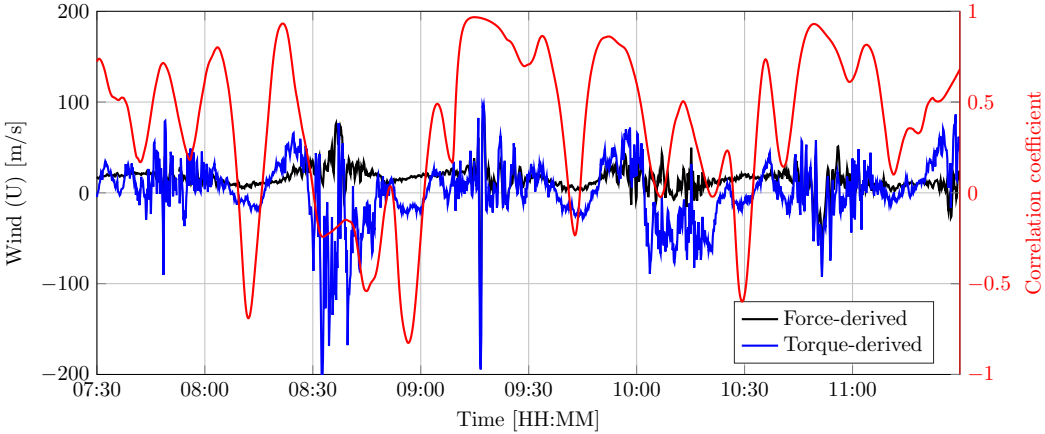
Correlation between the two sets

- Storm of April 5, 2010



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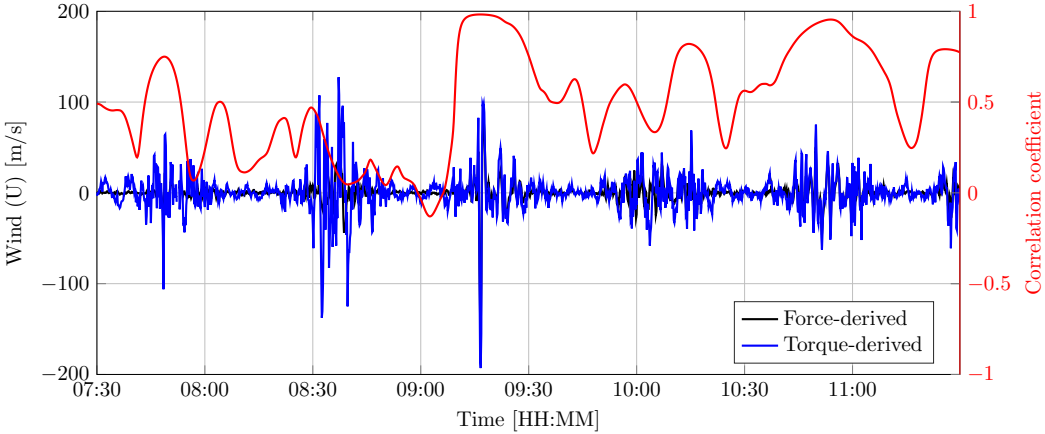
Correlation between the two sets – high-pass

- Storm of April 5, 2010



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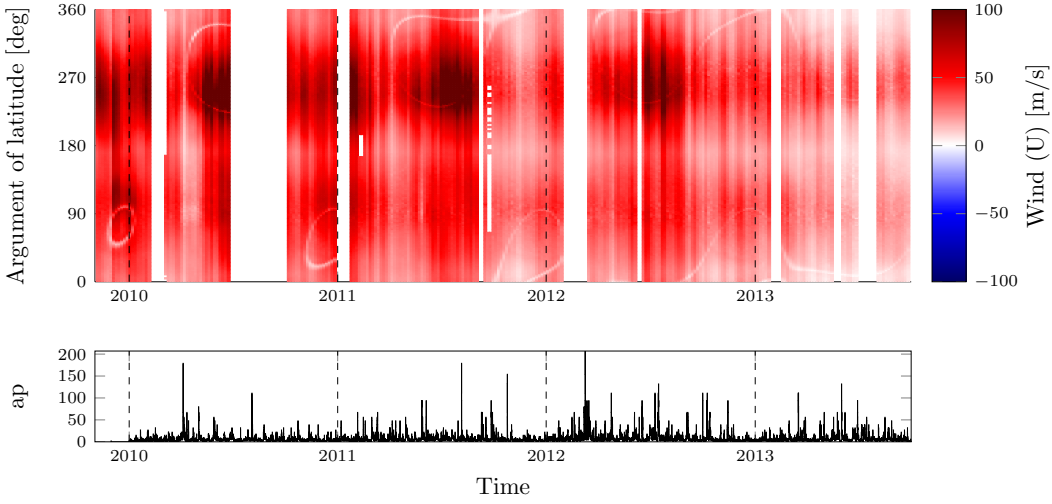
Vertical wind from forces



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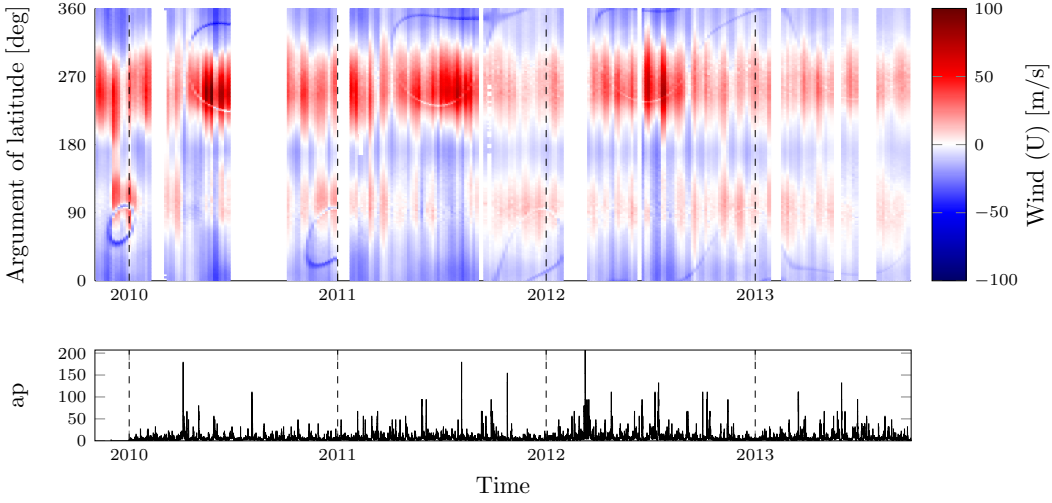
Vertical wind from forces – corrected for smoothed daily means



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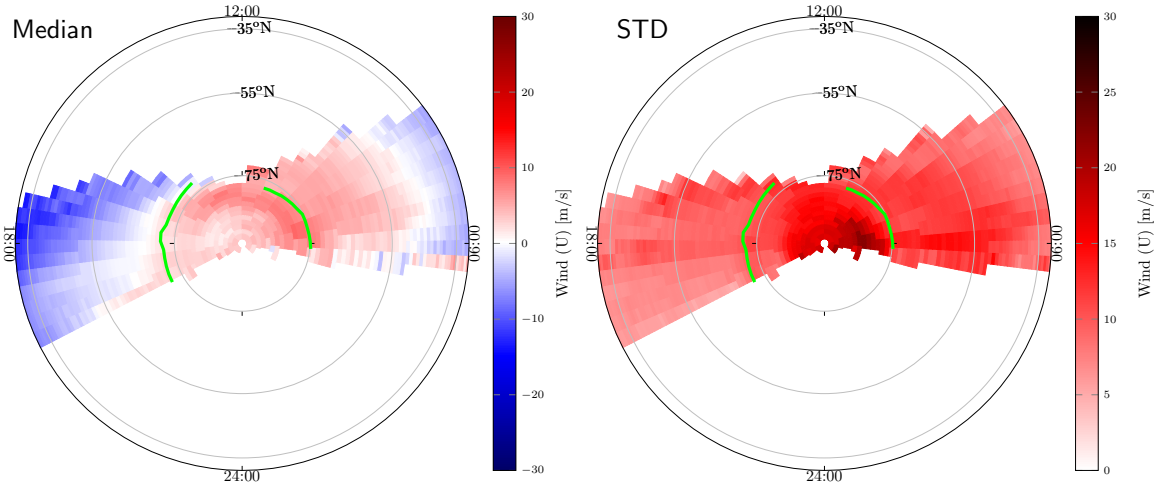
Dependence on Kp – North Pole



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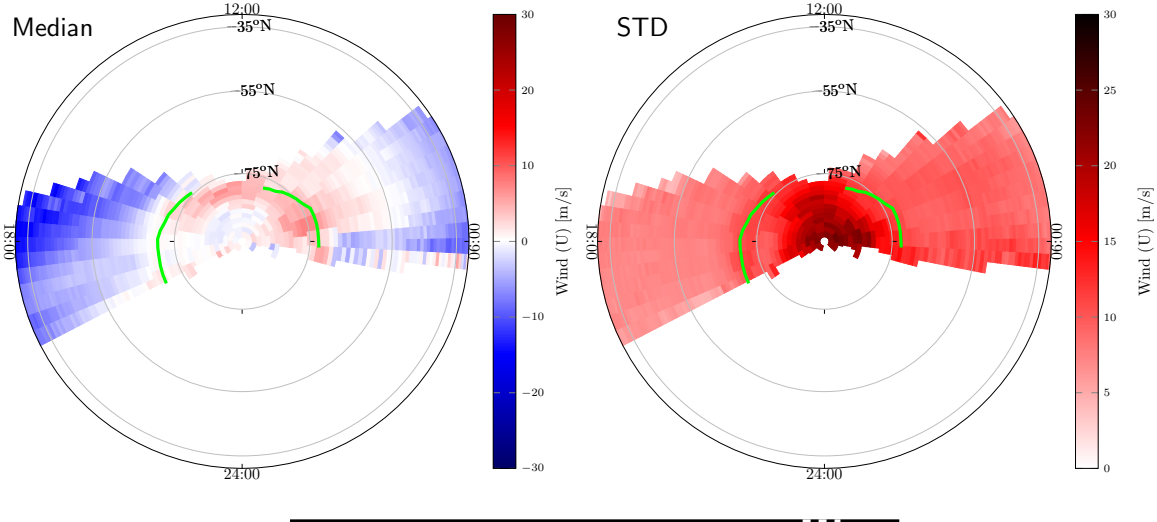

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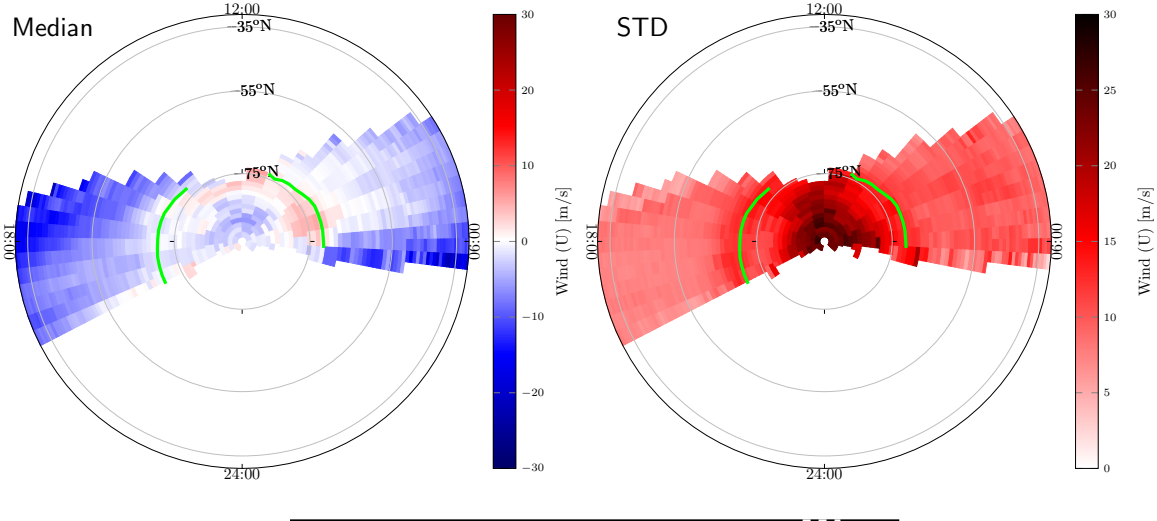

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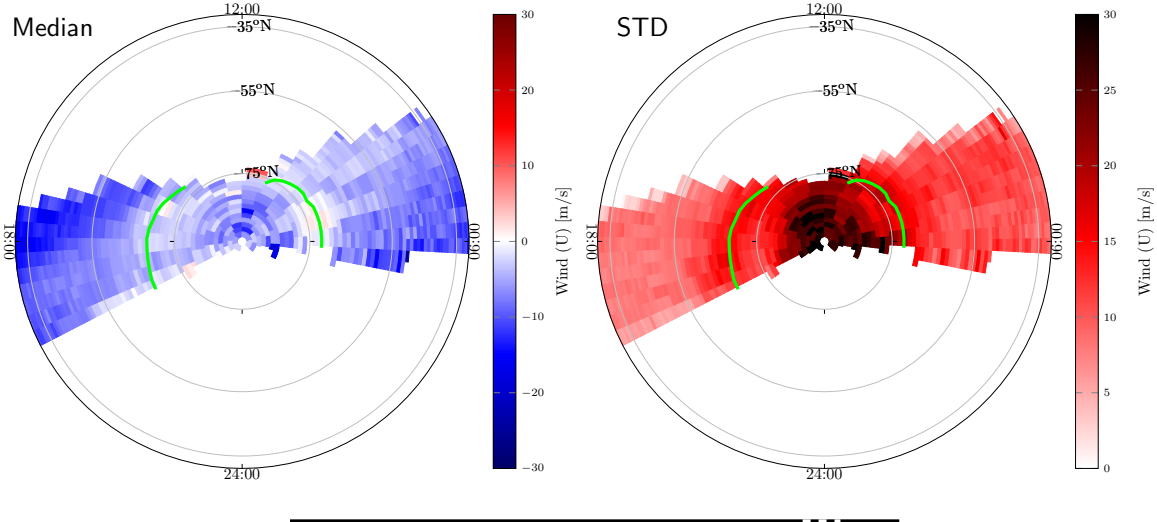

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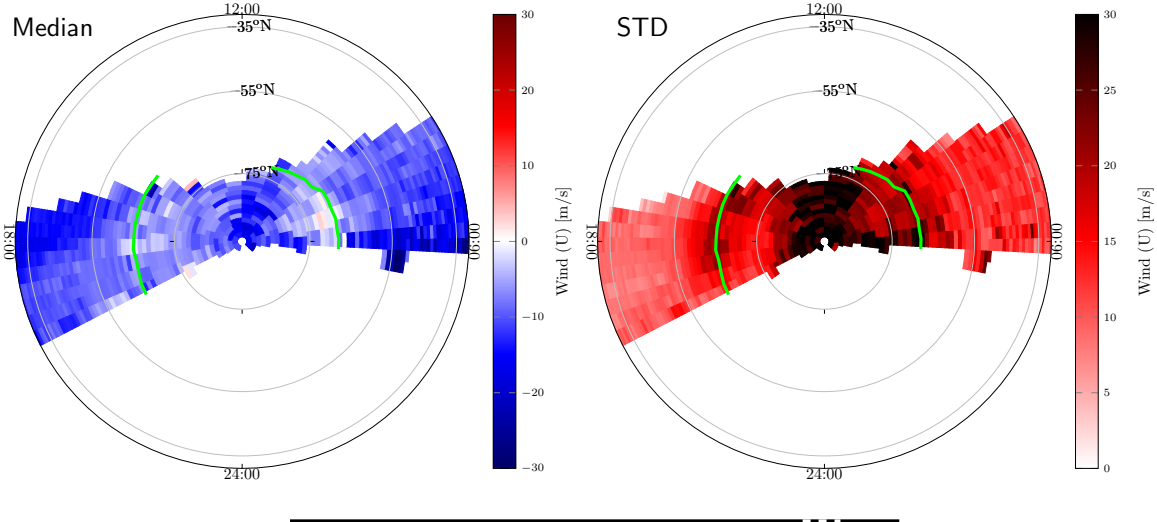

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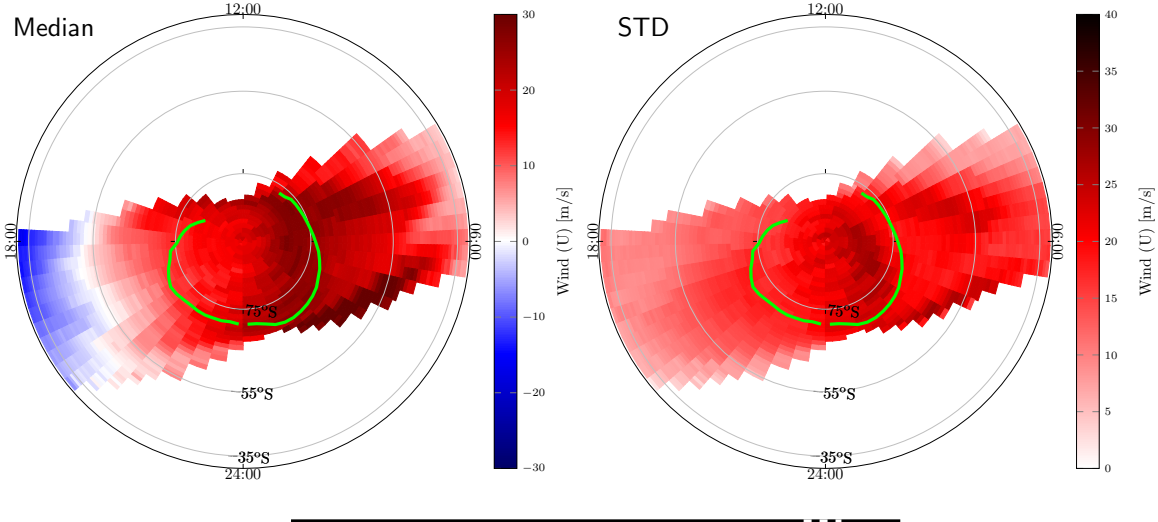

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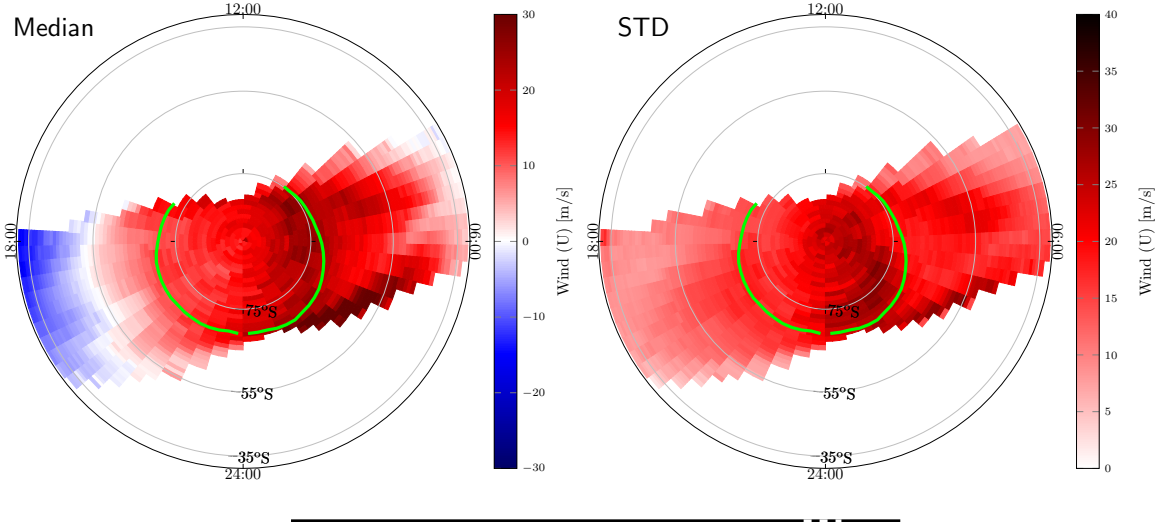

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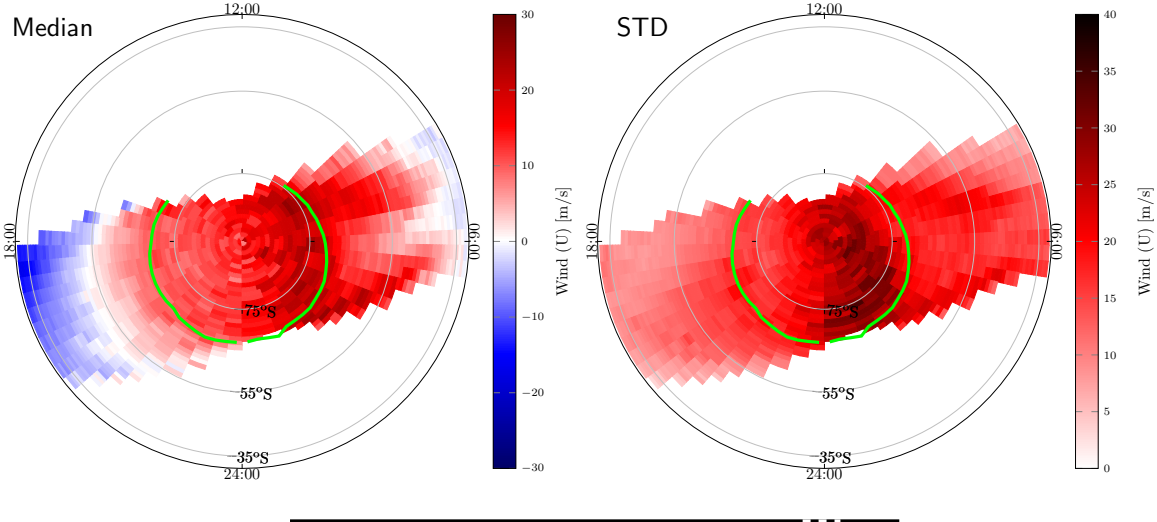

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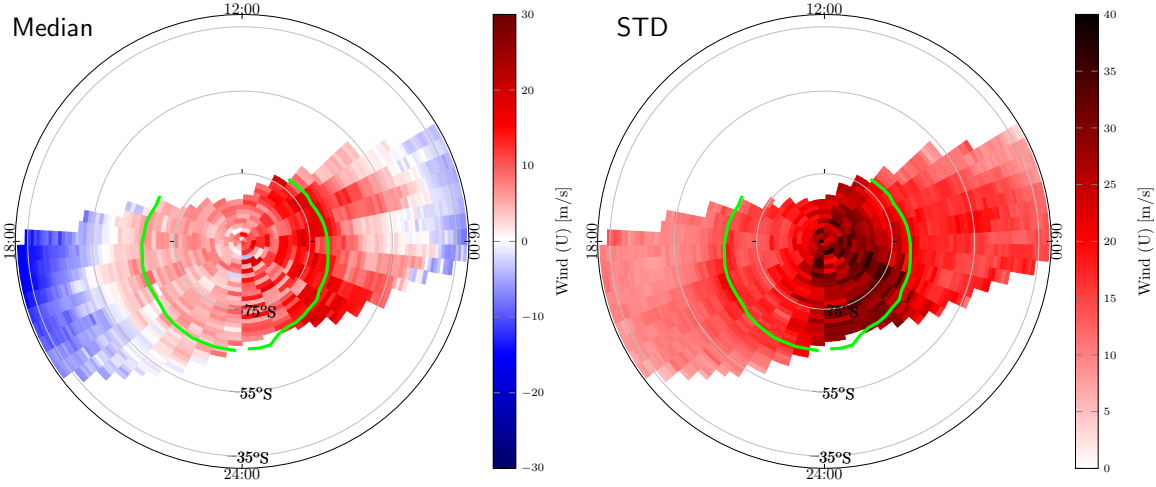

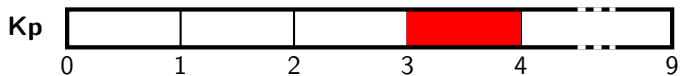

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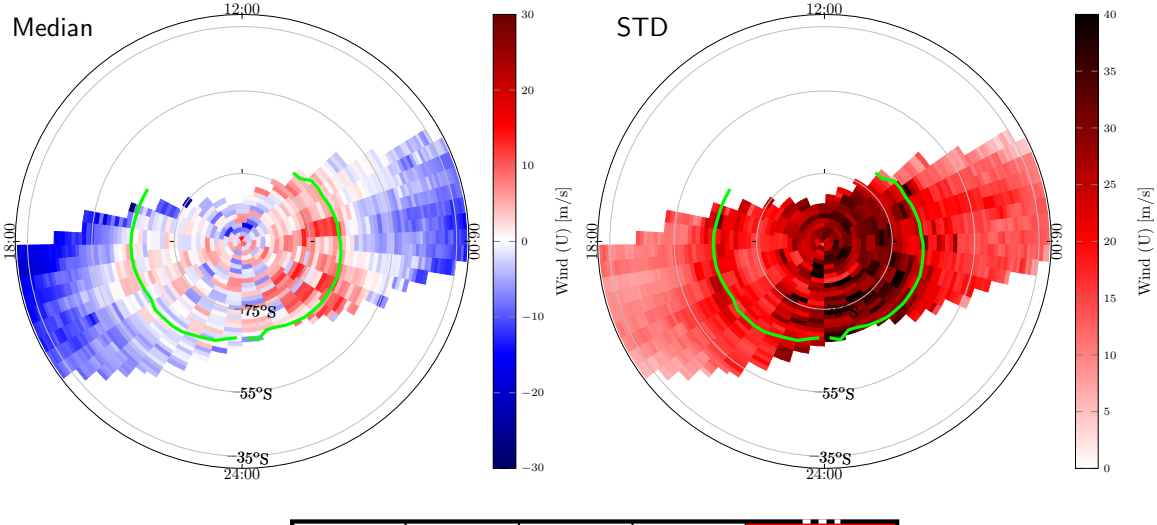

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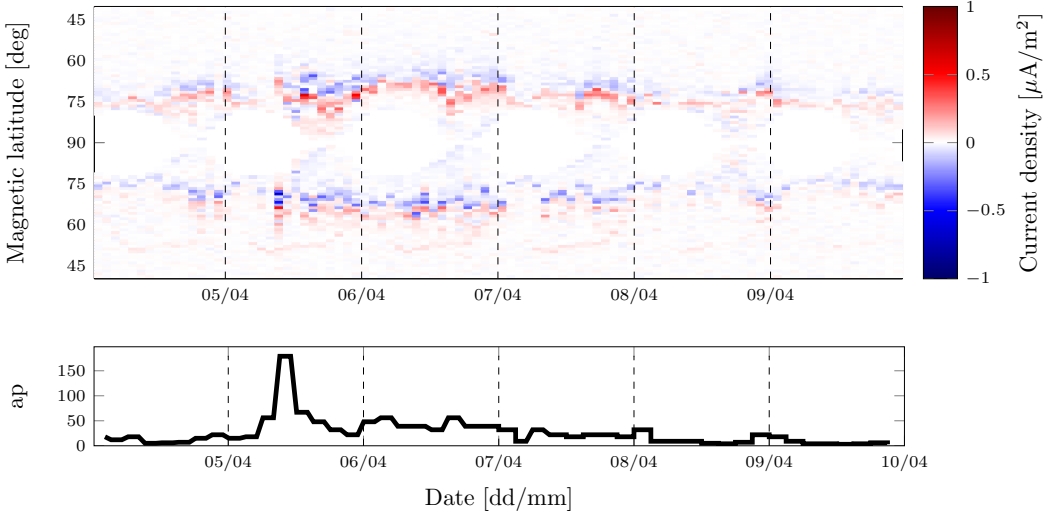
Storm April 2010 – FAC



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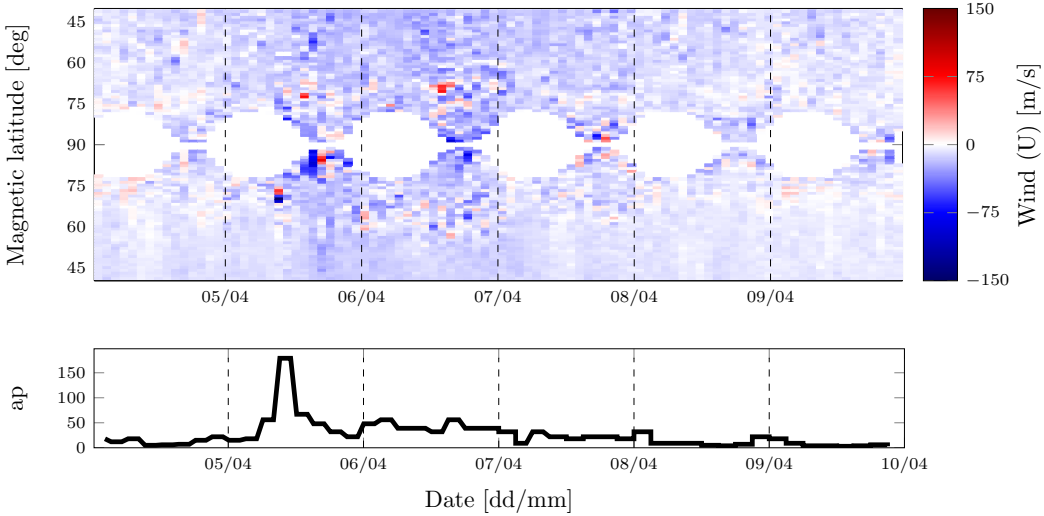
Storm April 2010 – Vertical wind



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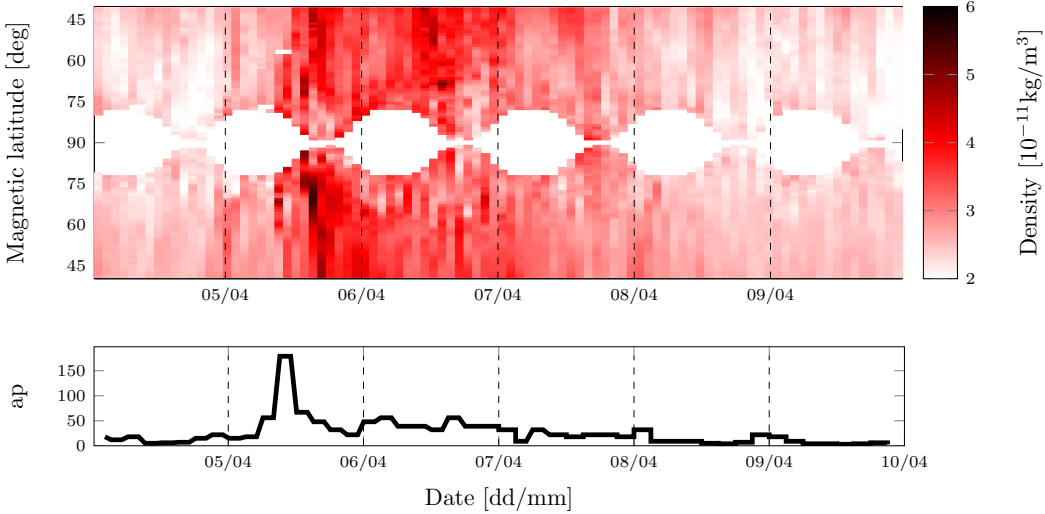
Storm April 2010 – Density



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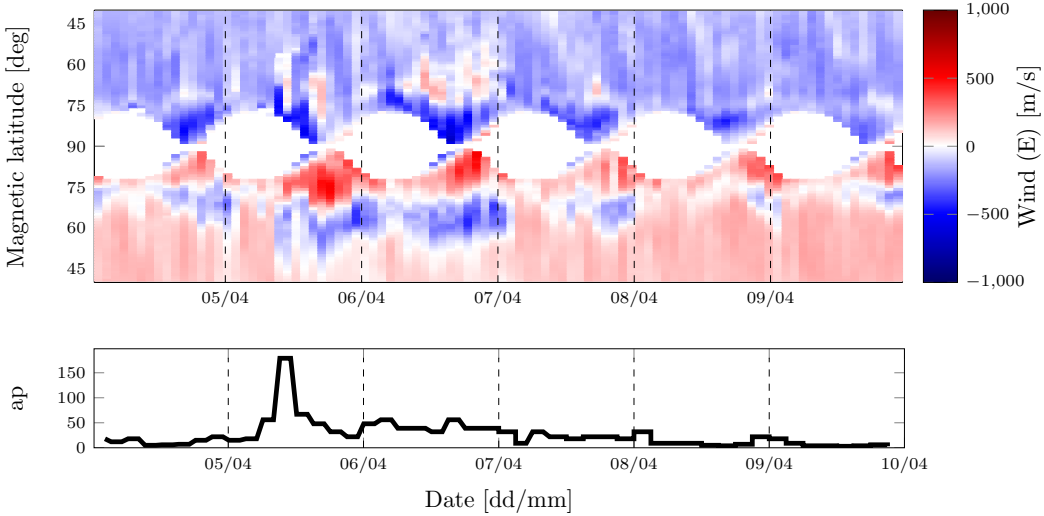
Storm April 2010 – Horizontal wind



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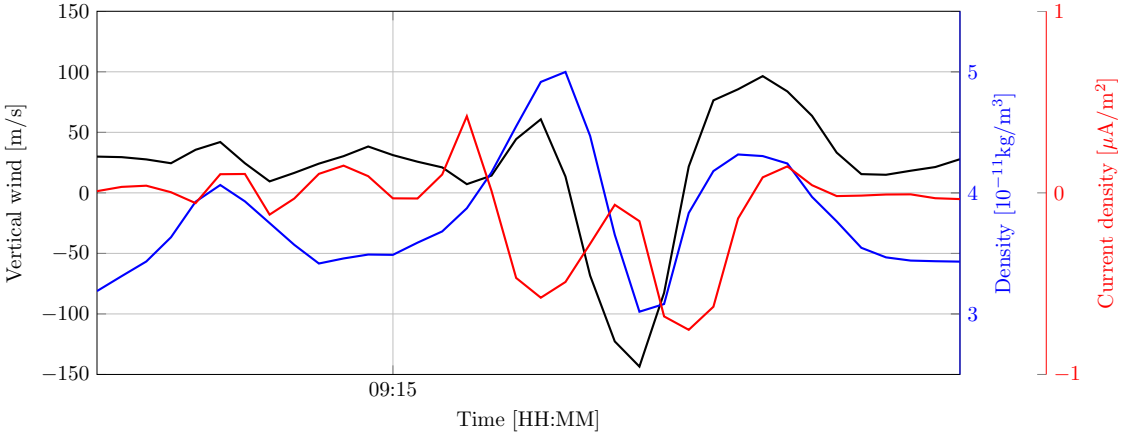
Storm April 5, 2010 – Zoomed in



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Conclusions

- GOCE: a space weather mission (Poster X4.266, Doornbos et al.);
- Vertical wind peaks verified;
- Clear vertical wind response to geomagnetic activity;
- Waves propagate towards the magnetic poles.

Plots generated using `M_Map` and `matlab2tikz`.

Conclusions

- GOCE: a space weather mission (Poster X4.266, Doornbos et al.);
- Vertical wind peaks verified;
- Clear vertical wind response to geomagnetic activity;
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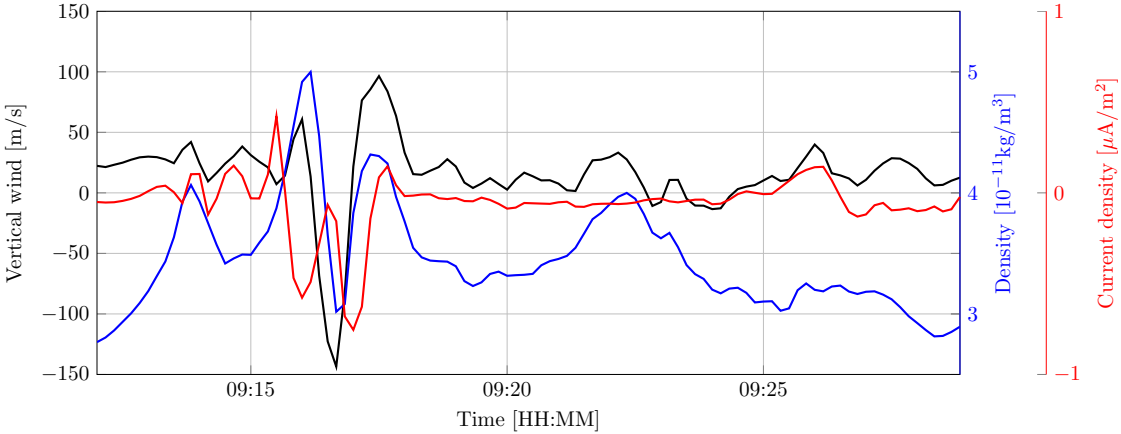
Future work

- Reprocessing GOCE data;
- Further improvement of the force/torque models;
- Validation with other vertical wind data sets.

Plots generated using `M_Map` and `matlab2tikz`.

EXTRA SLIDES

Storm April 5, 2010



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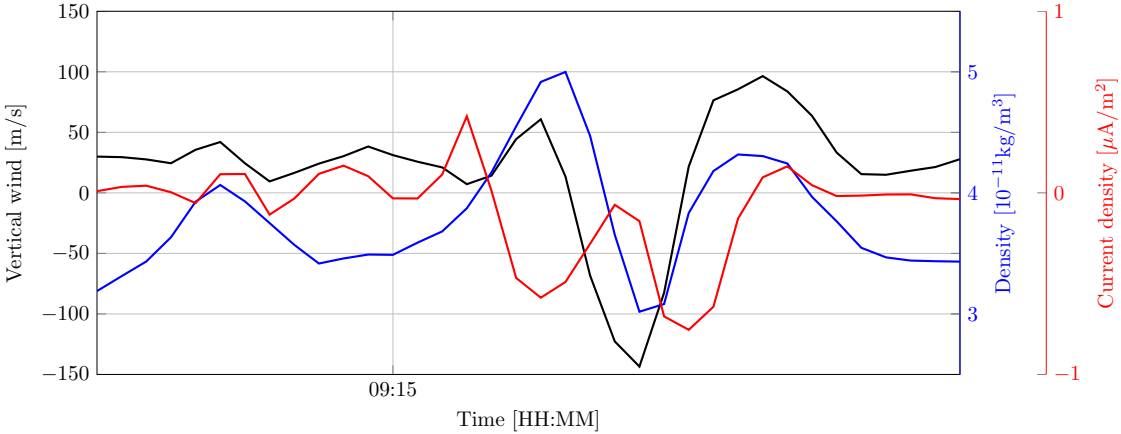
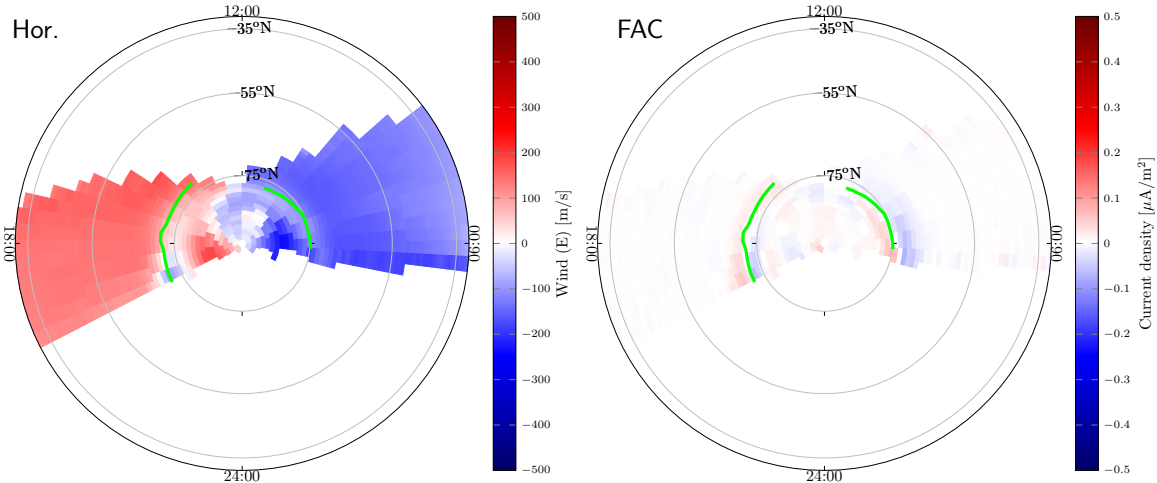
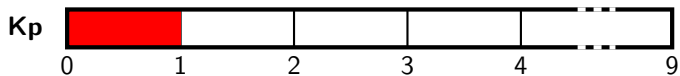


Dependence on Kp – North Pole





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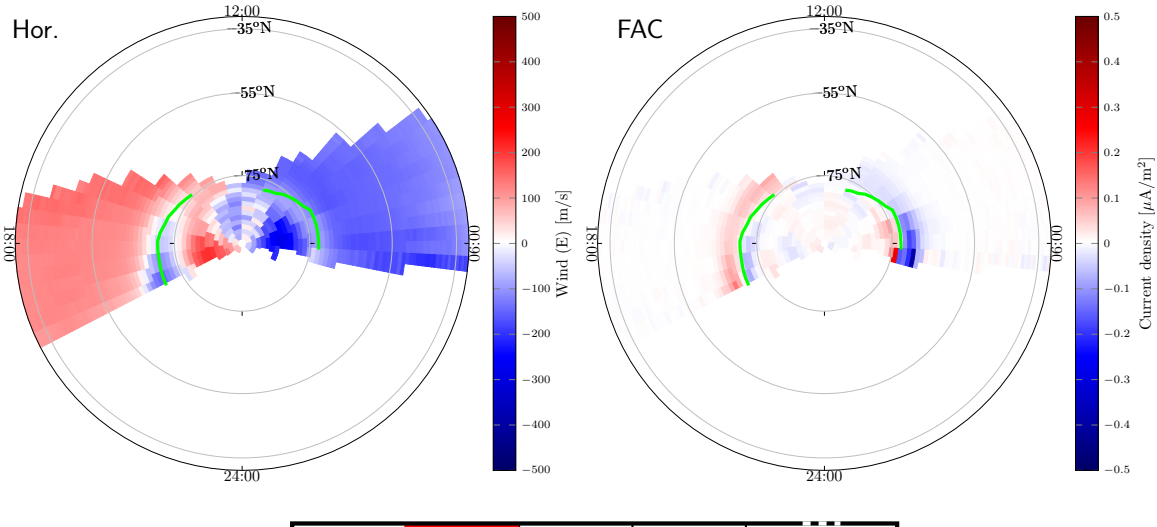

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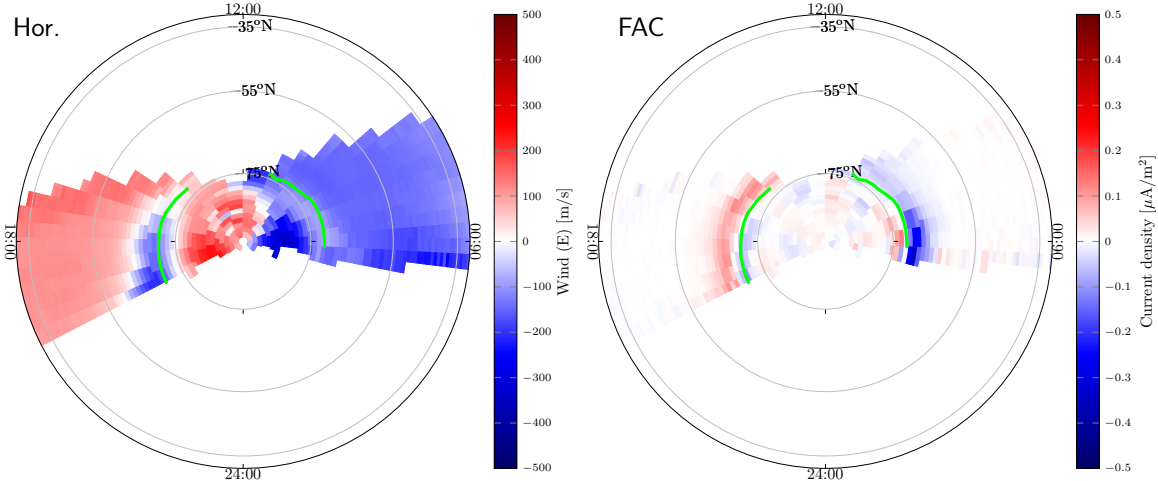

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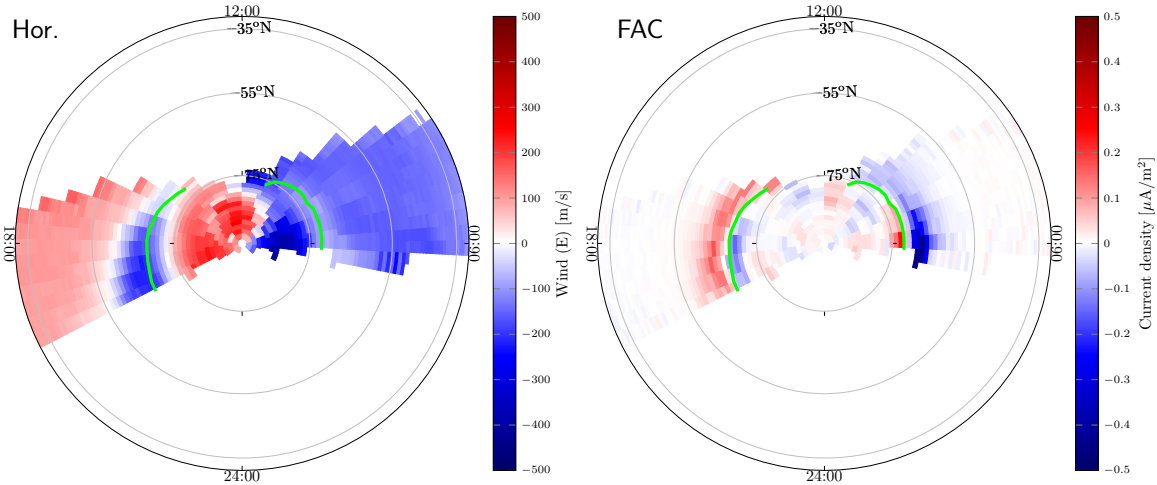

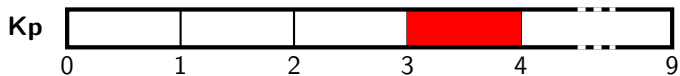

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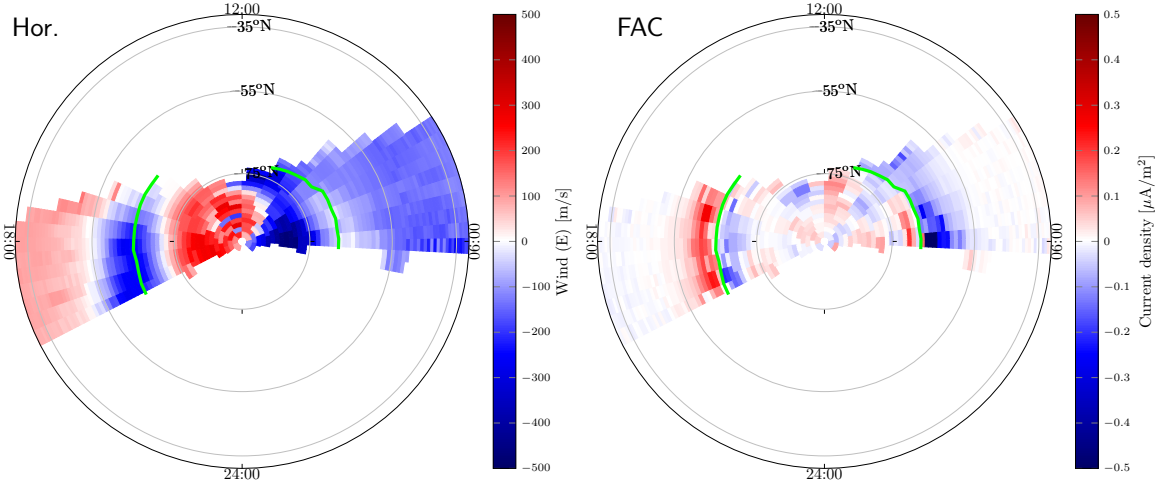

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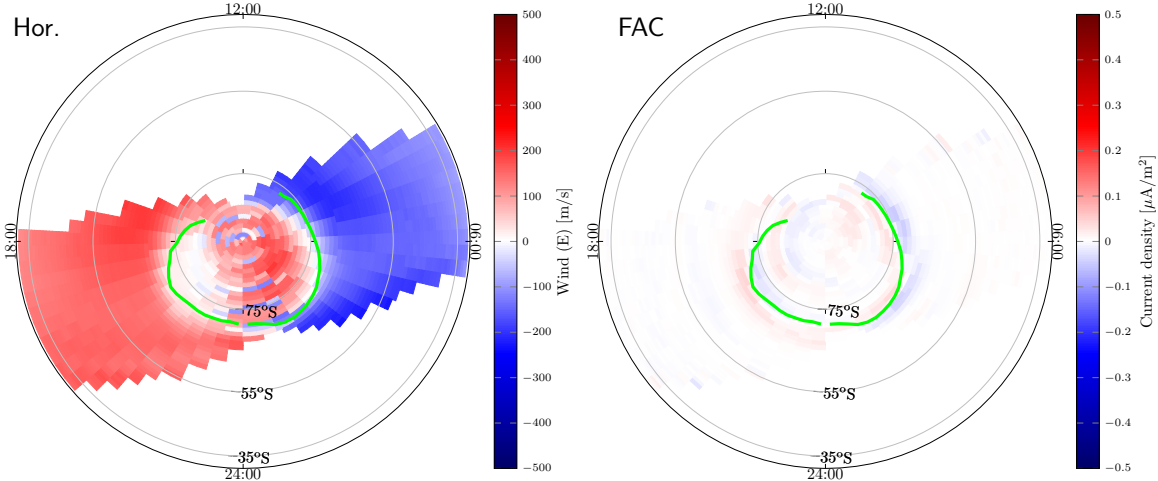

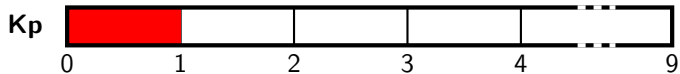

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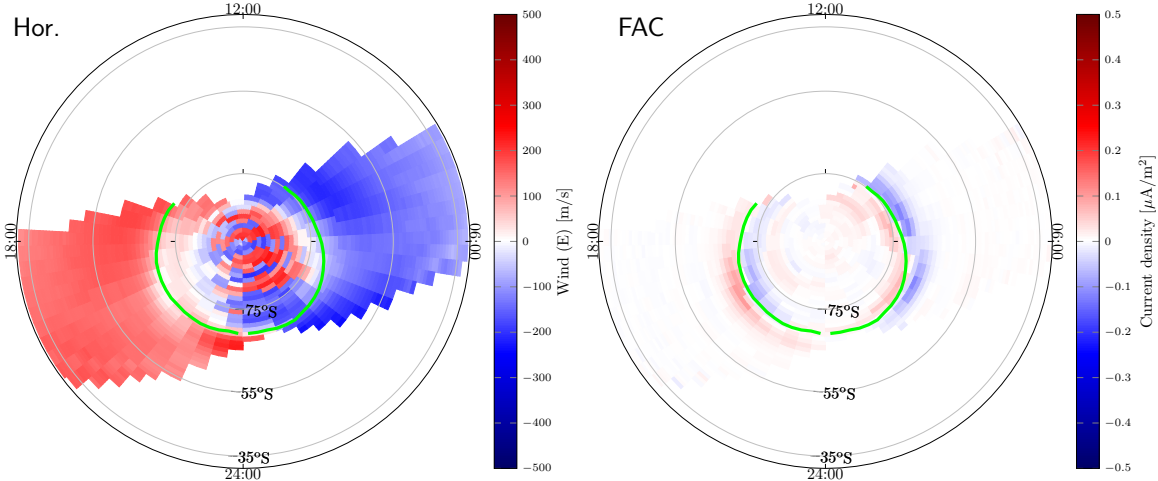

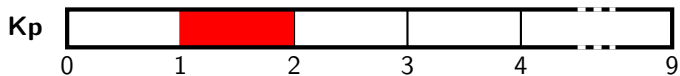

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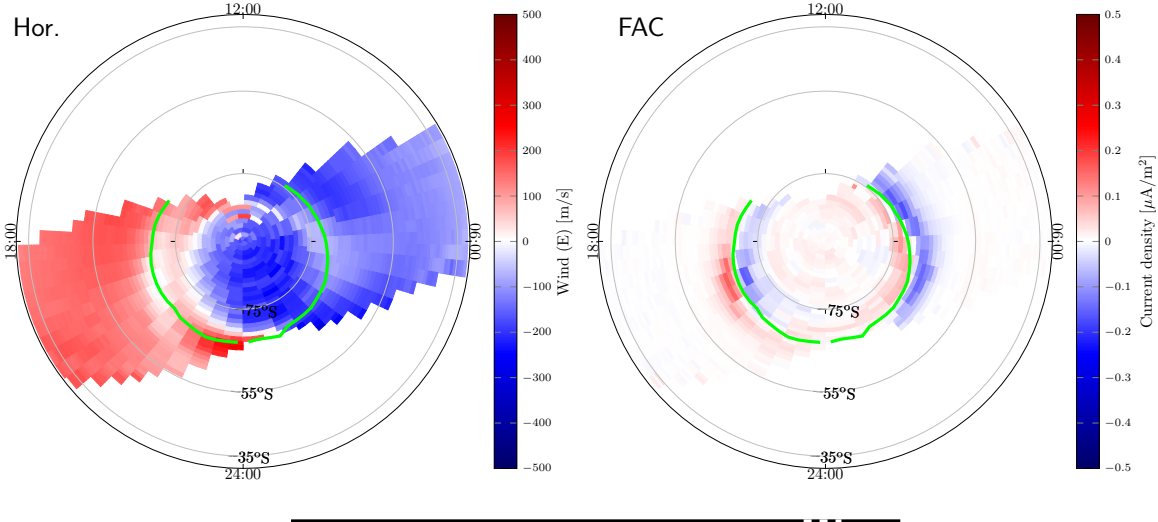

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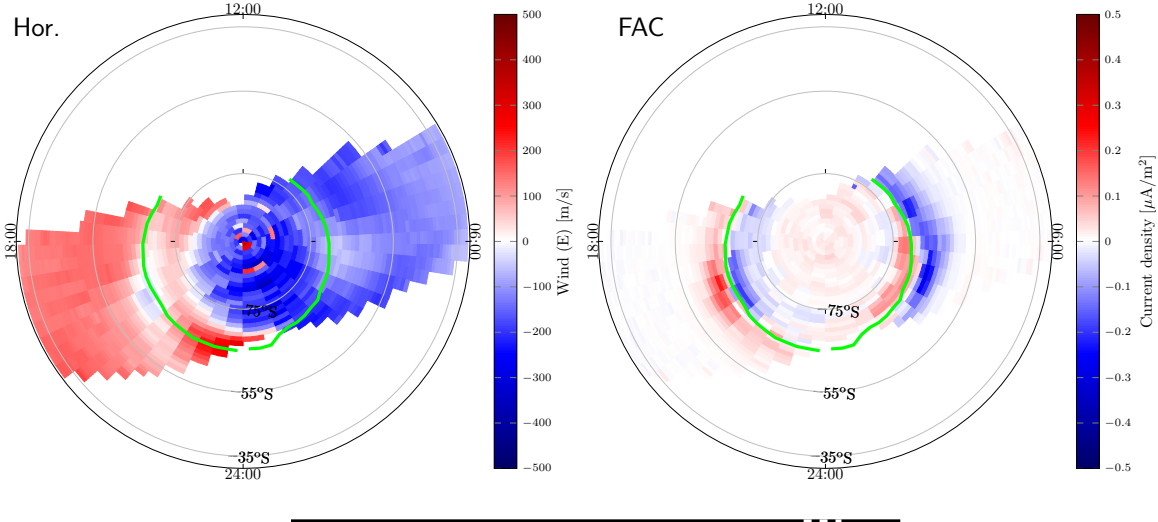

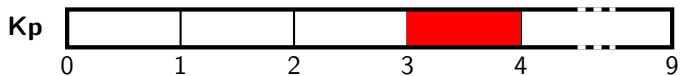

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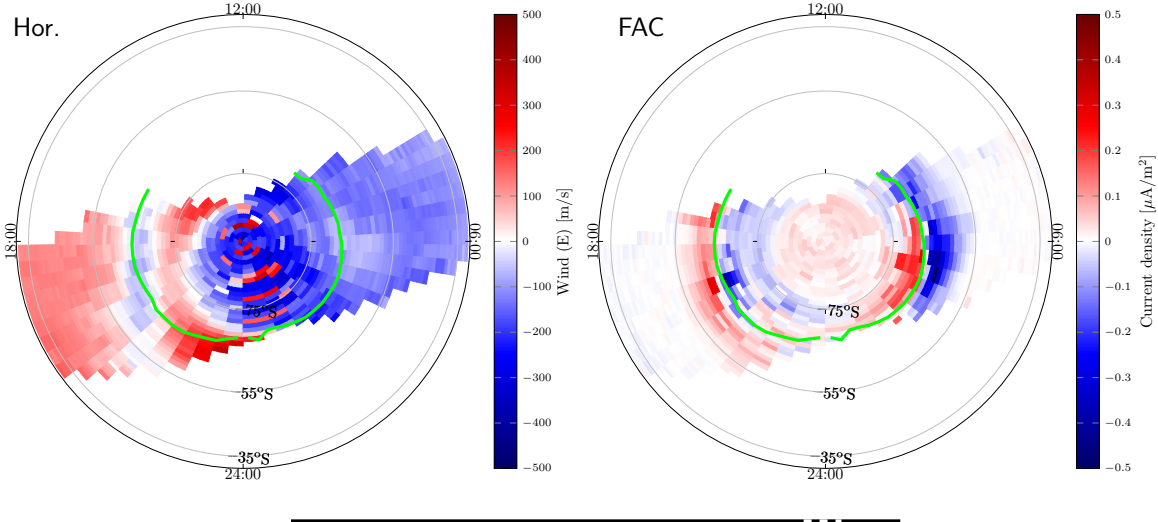
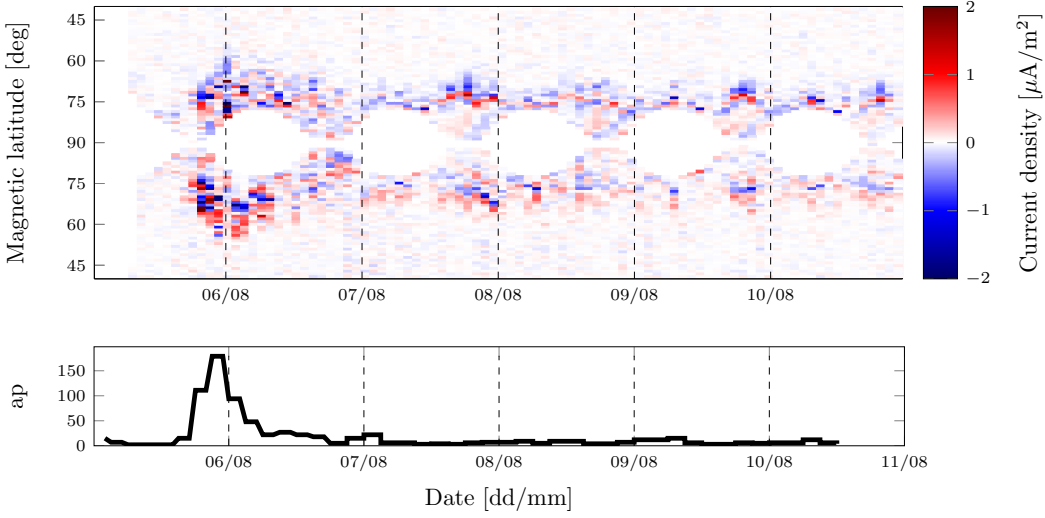


Storm August 2011 – FAC



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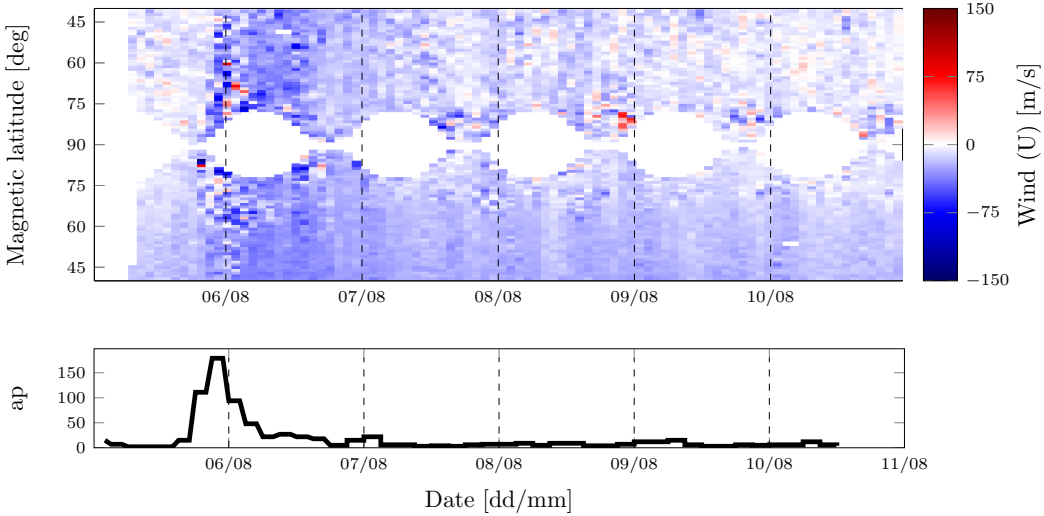
Storm August 2011 – Vertical wind



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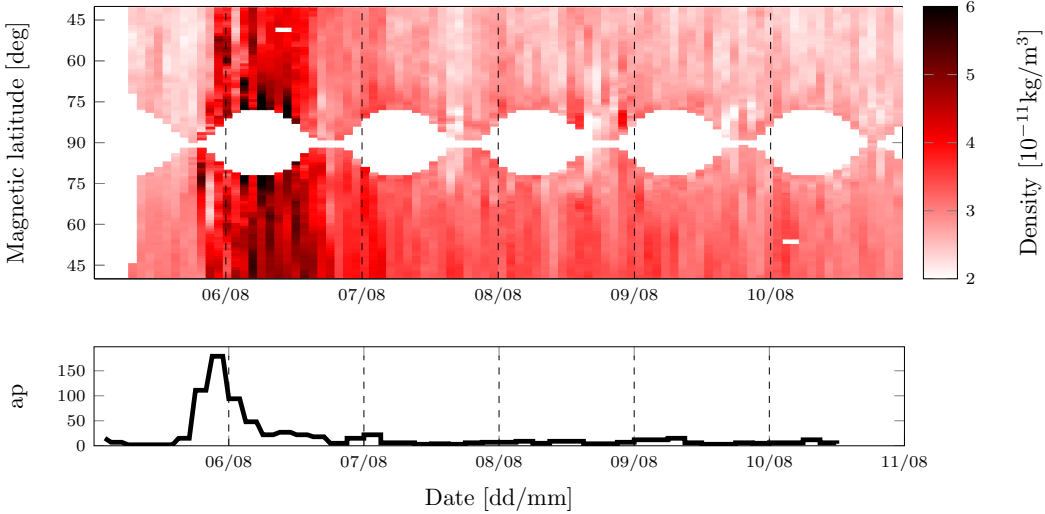
Storm August 2011 – Density



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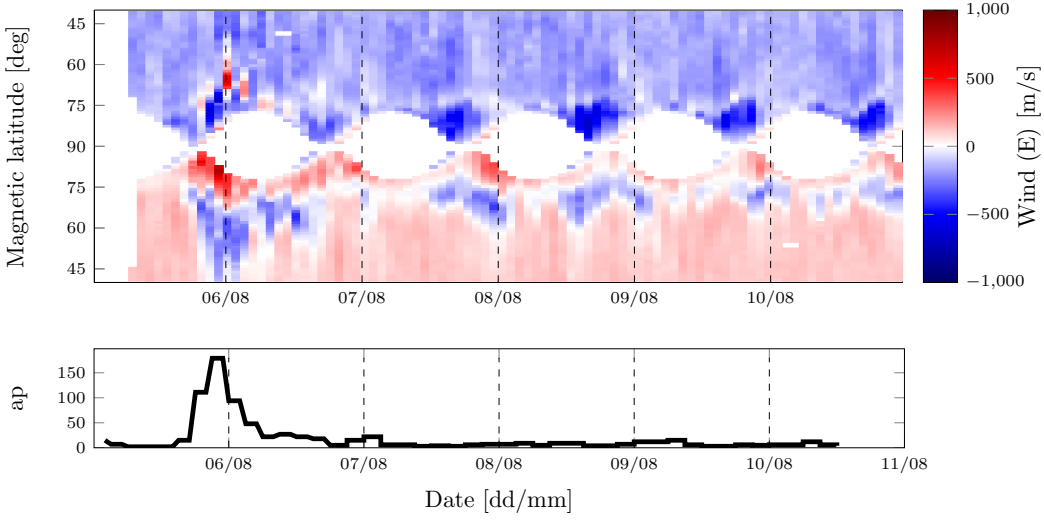
Storm August 2011 – Horizontal wind



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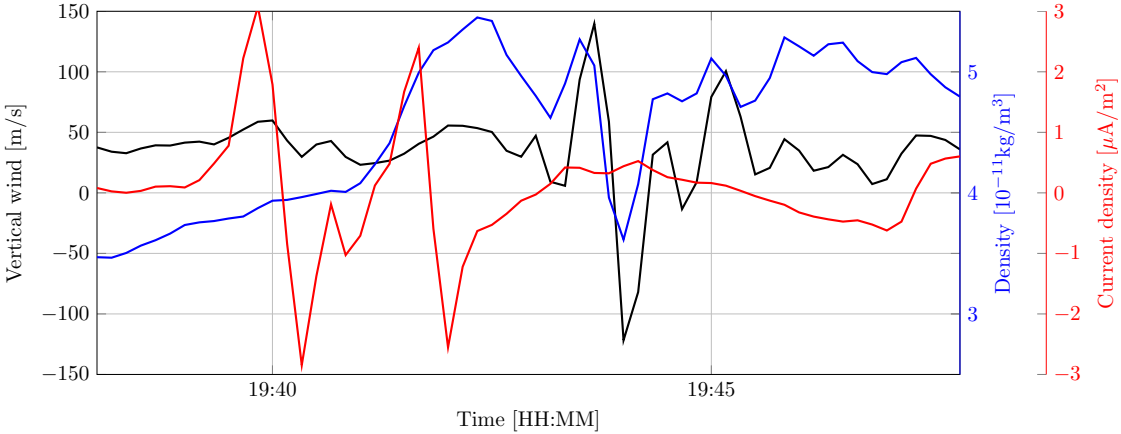

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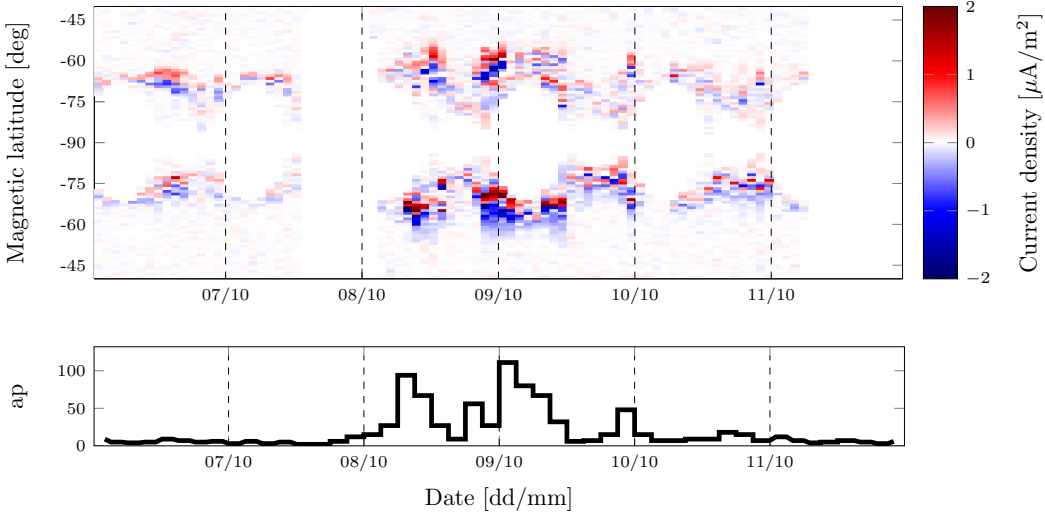

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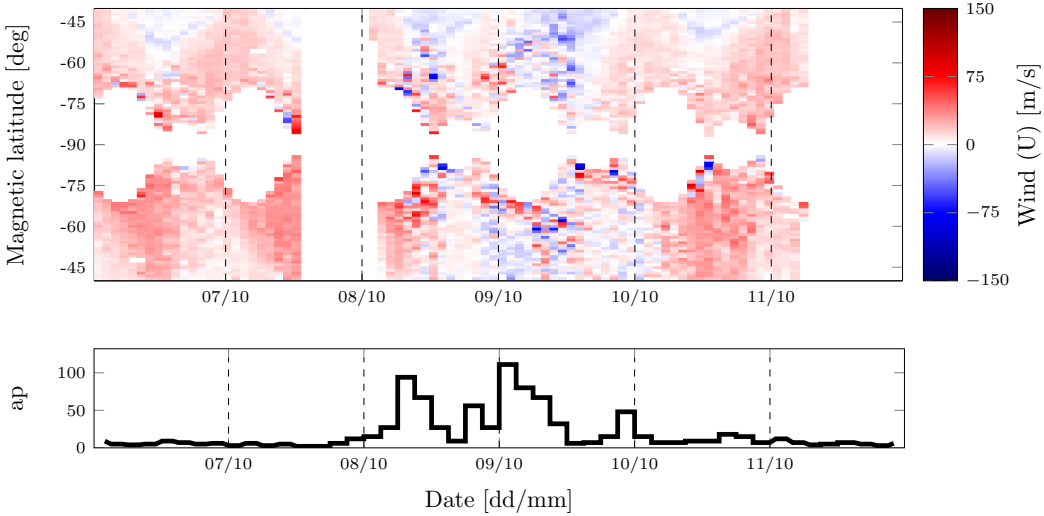
Storm October 2012 – Vertical wind



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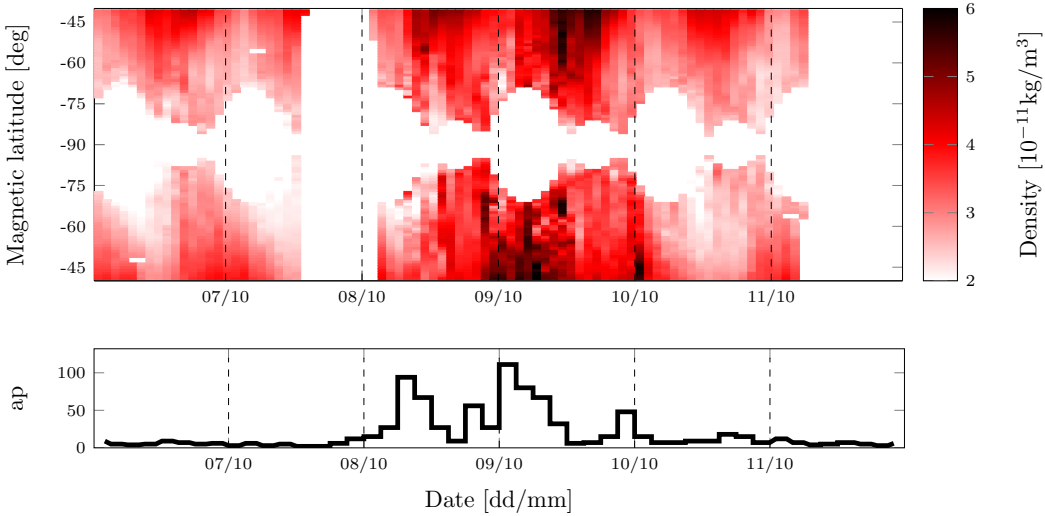

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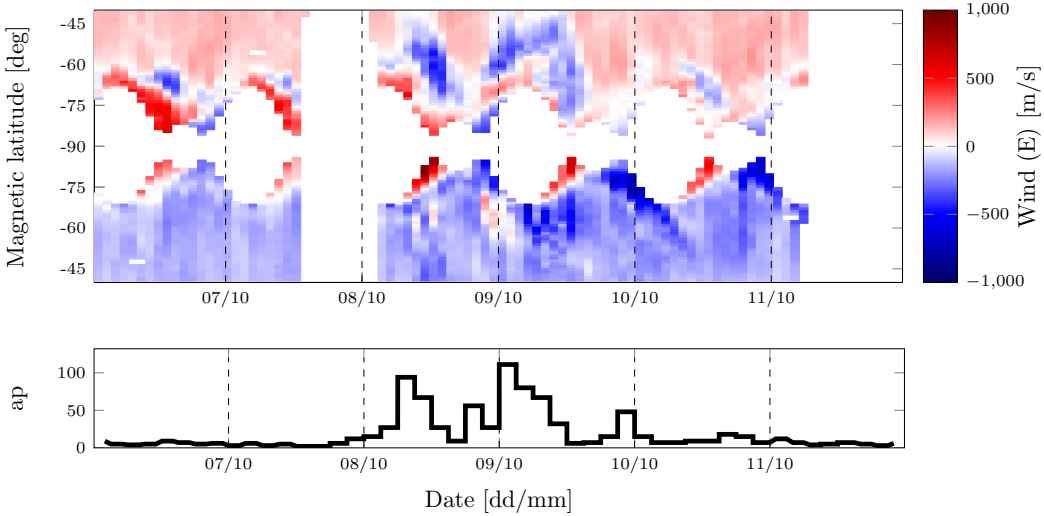
Storm October 2012 – Horizontal wind



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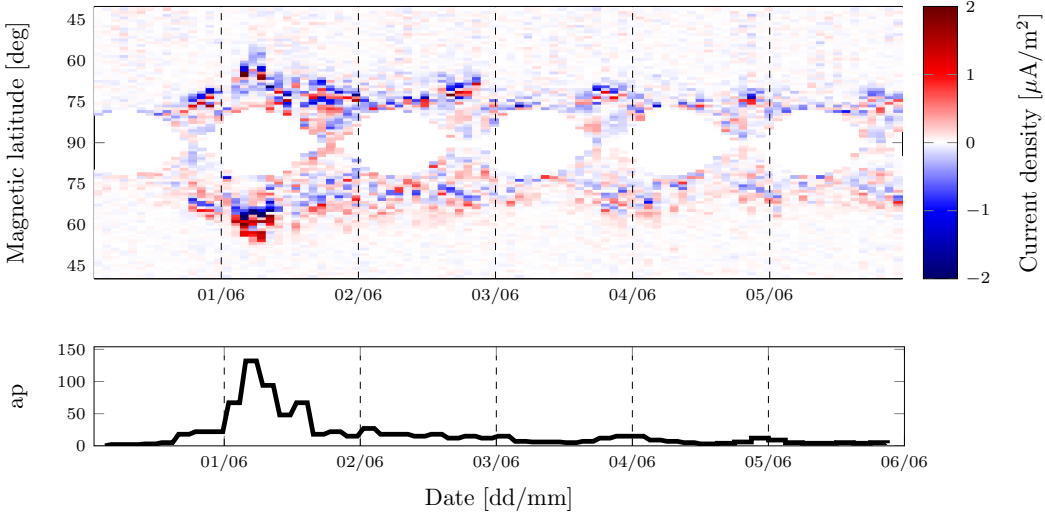
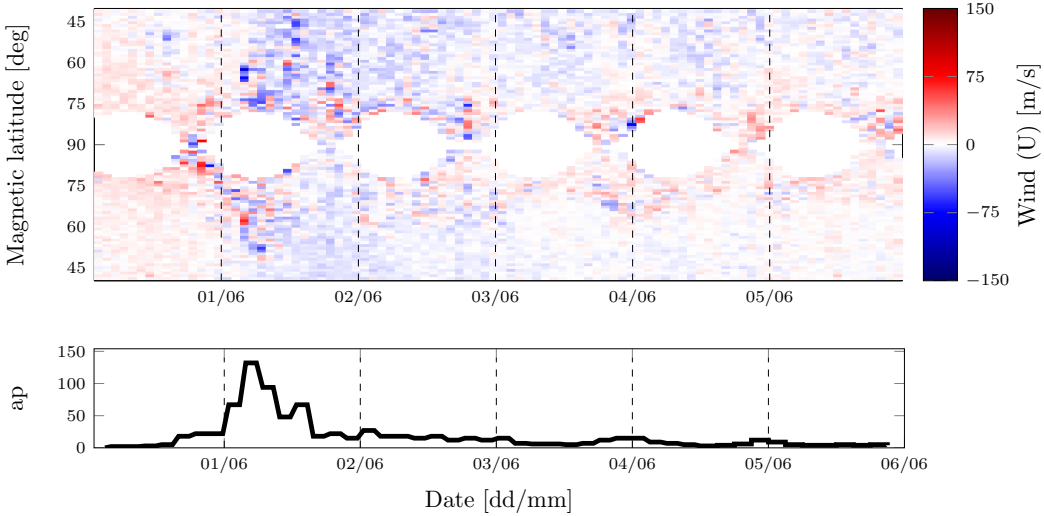
Storm June 2013 – FAC



Storm June 2013 – Vertical wind



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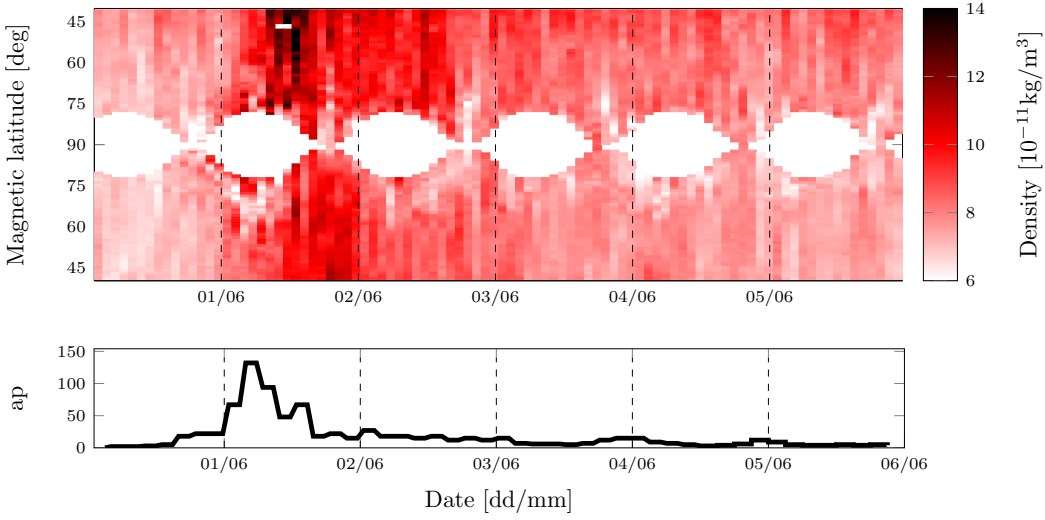

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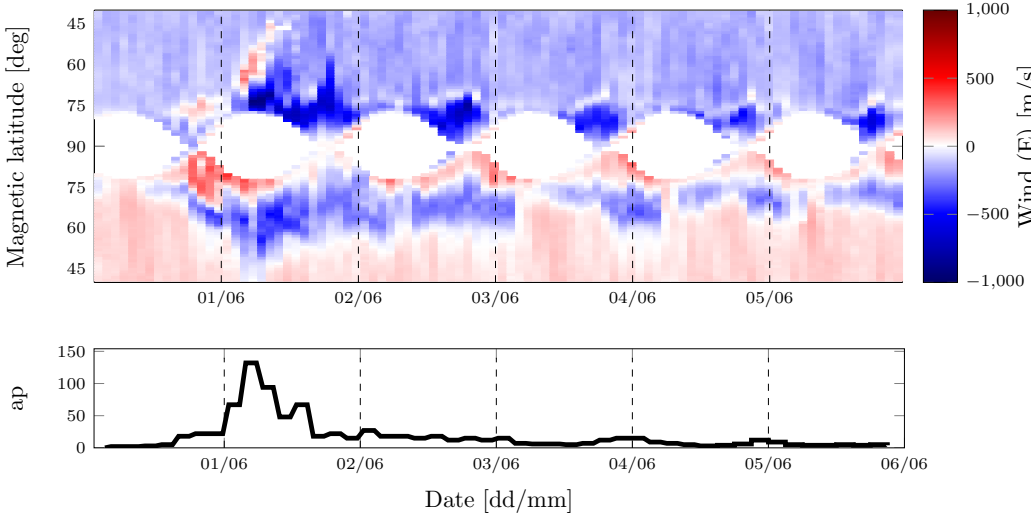

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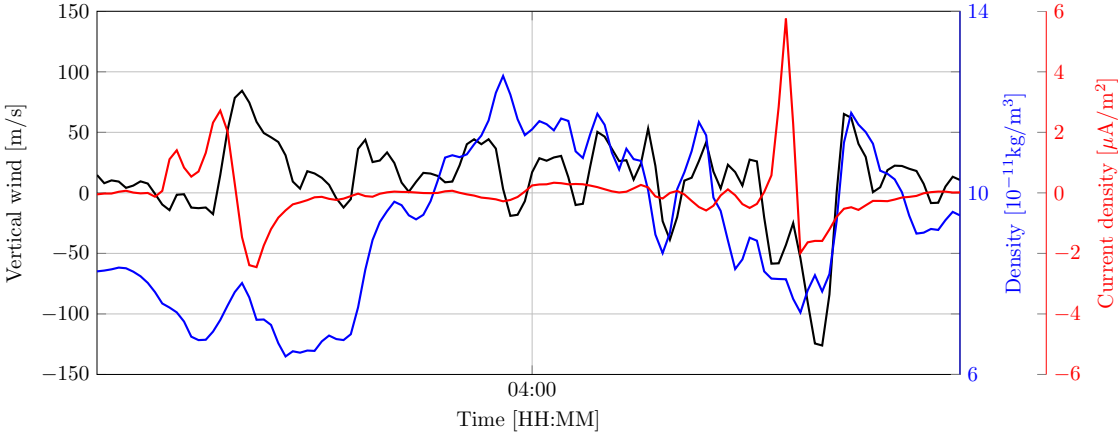

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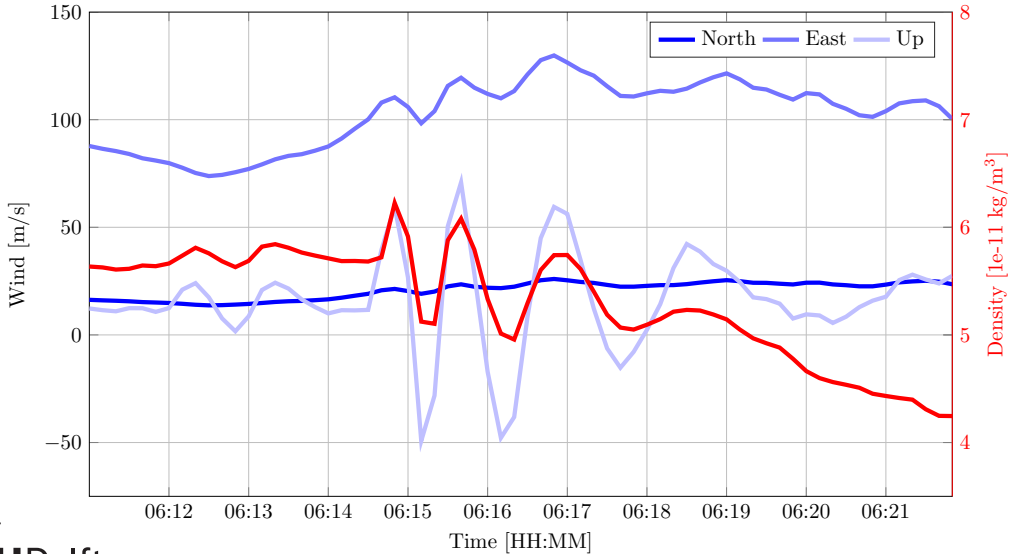
Tohoku Earthquake – First pass



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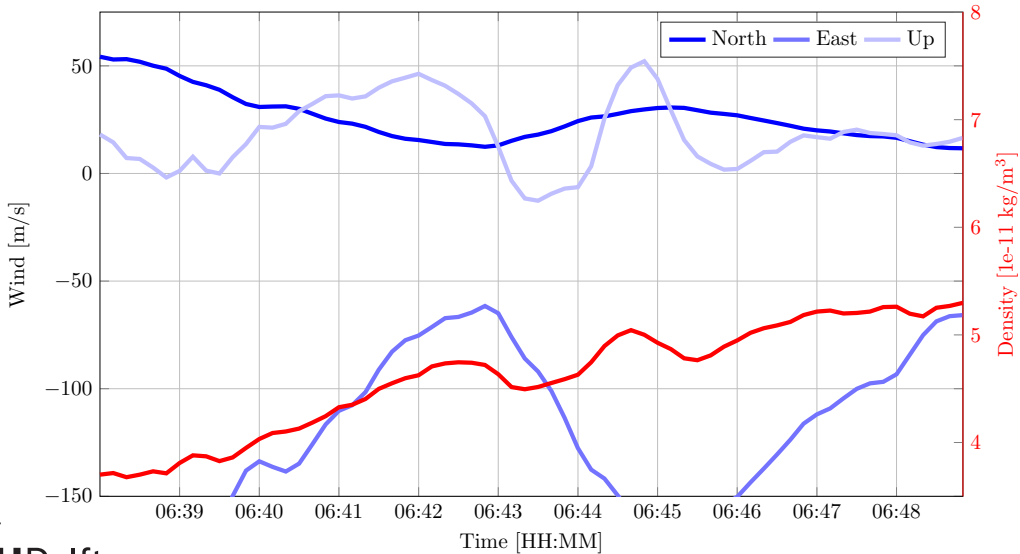
Tohoku Earthquake – Second pass



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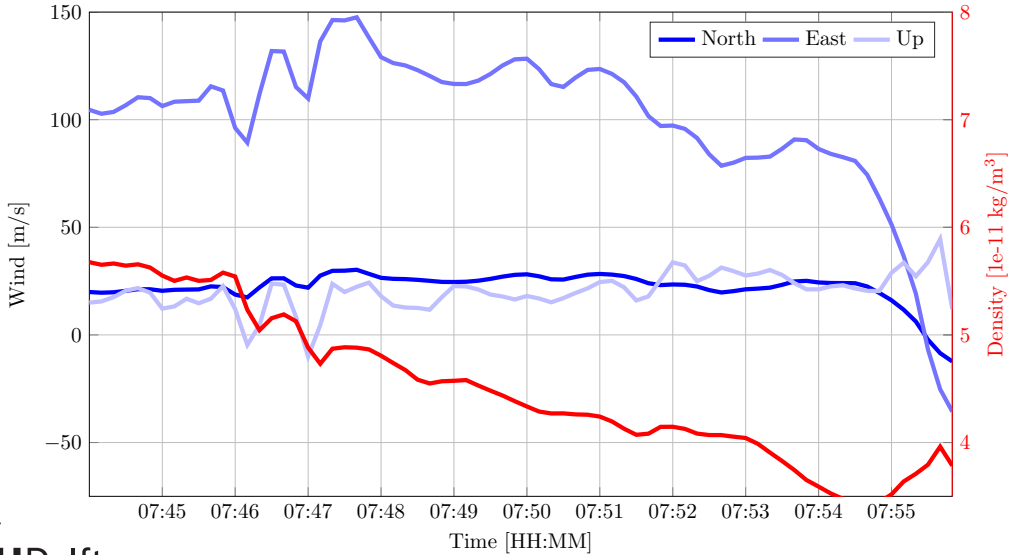
Tohoku Earthquake – Third pass



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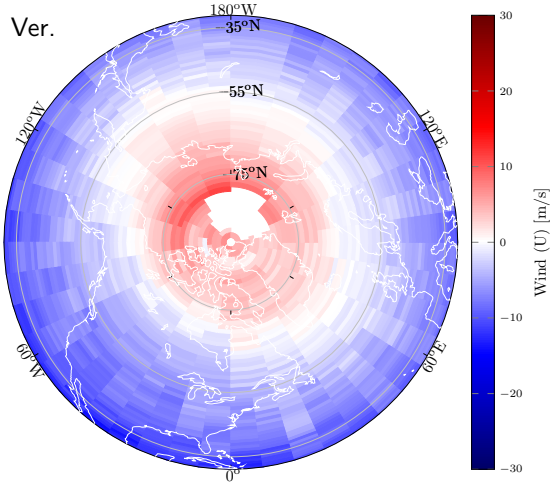
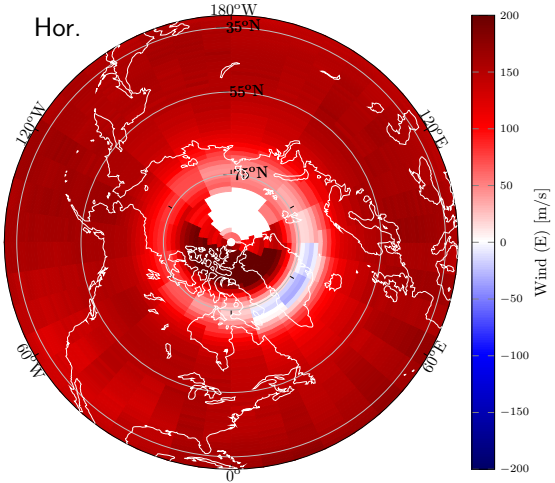
Quiet local winter, dusk – North Pole

Ver.



Hor.



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