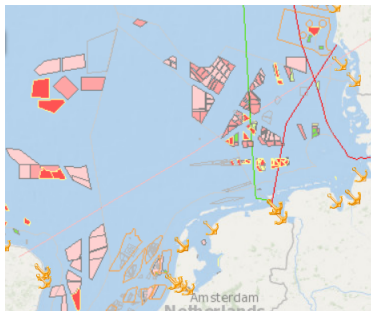# Wind farm induced changes in wind speed and surface fluxes over the North Sea

Fabien Chatterjee, Johan Meyers, Nicole v. Lipzig

March 9, 2016

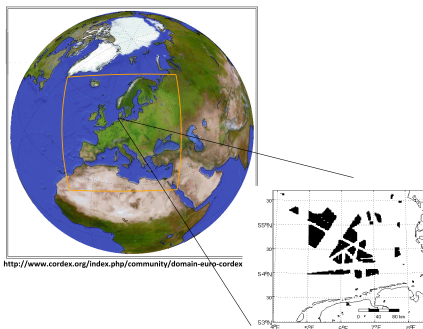# Introduction

http://www.4coffshore.com/

- Strong Expansion in windfarm deployment: 40 GW by 2020
- Impacts of wind farms on each other? On regional climate ?

Nesting Strategy

EURO-CORDEX

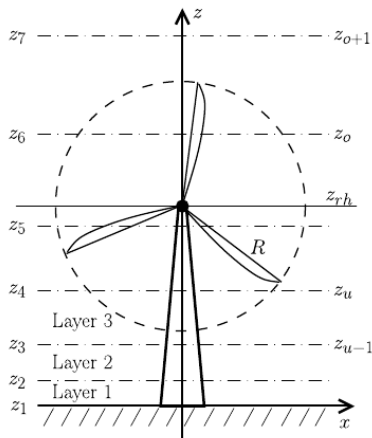http://www.cordex.org/index.php/community/domain-euro-cordex

- 11 km $\rightarrow$ 1.5 km
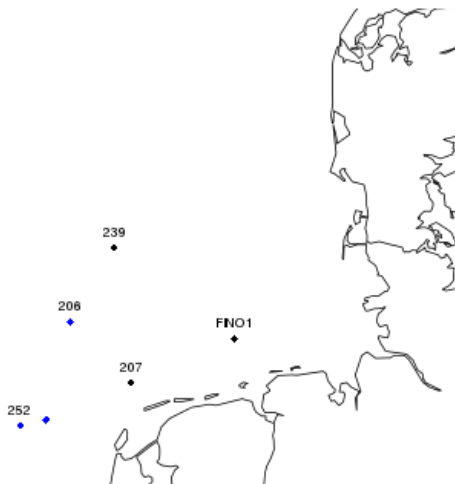- 40 layers: 2 full, 1 half intersecting rotor

Wind turbines in Cosmo-CLM

$$F_{tFITCH} = f(C_T, U^2, N)$$
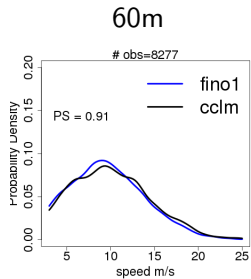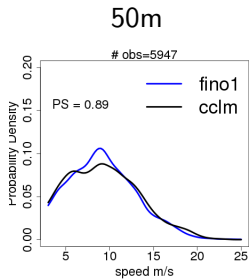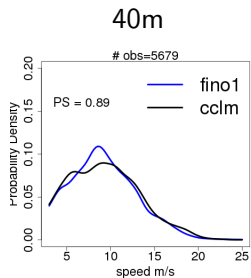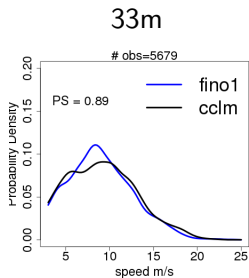
$$TKE_{FITCH} = f(C_T, U^3, N)$$
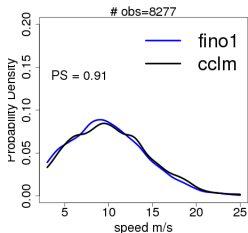
Station location

background

- Compare with FINO1
- interpolate to different heights.
- neutral stratification
- compare with Quikscat data
- interpolate to 10m
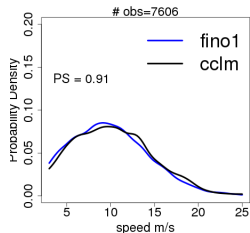
Wind speed cclm and fino
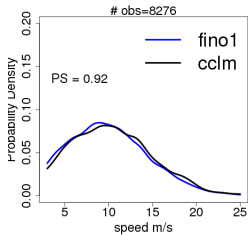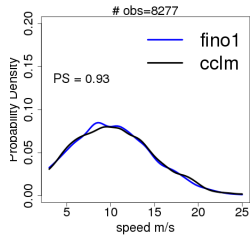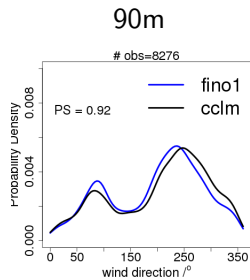
Wind speed cclm and fino
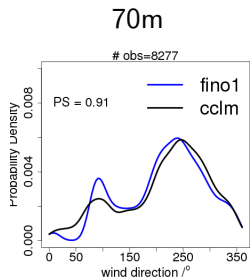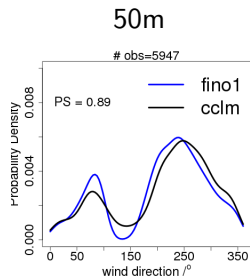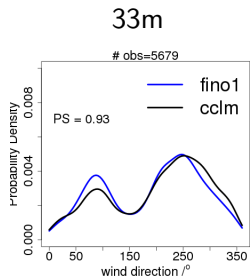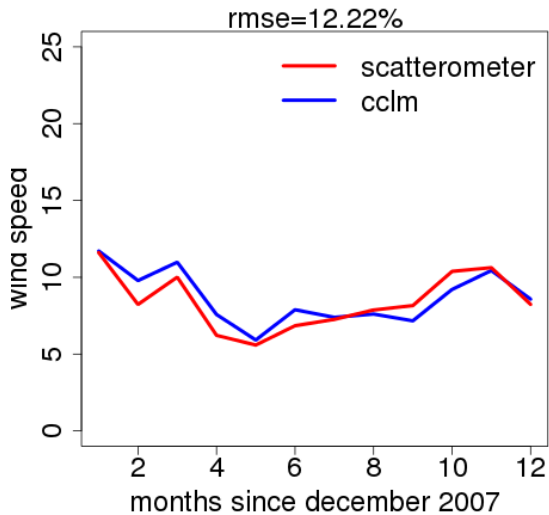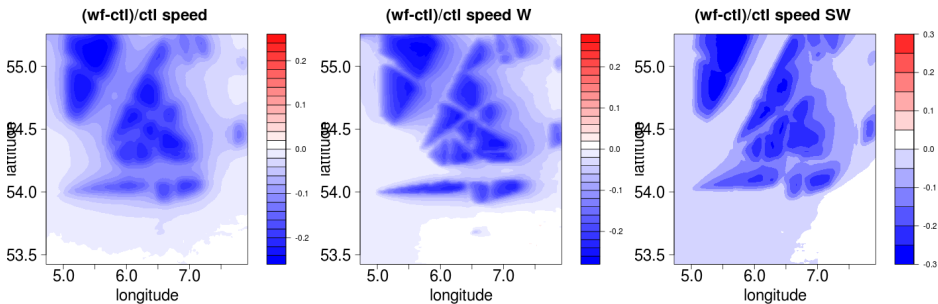
Direction cclm and fino

Quikscat

Impact of wind farms on the North Sea

Impact of wind farms on the North Sea

Impact of wind farms on the North Sea

Impact of wind farms on the North Sea
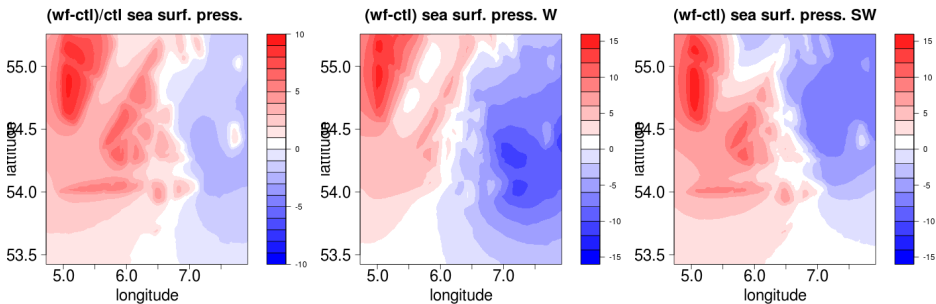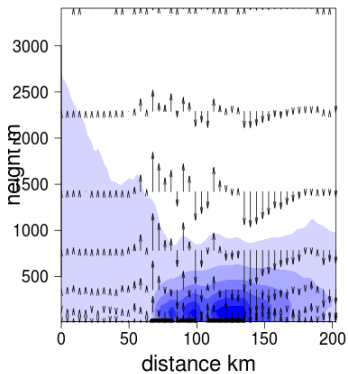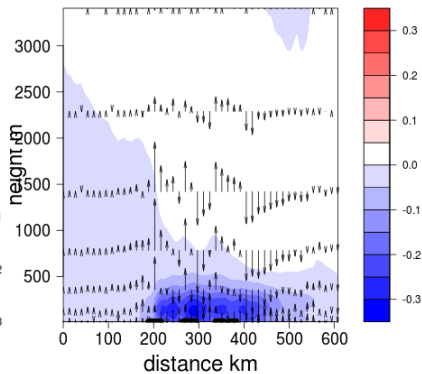
Impact of wind farms on the North Sea

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Impact of wind farms on the North Sea
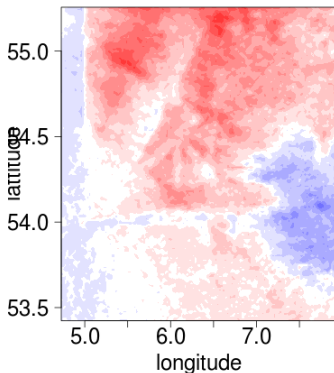

(wf-ctl)/ctl surf SW
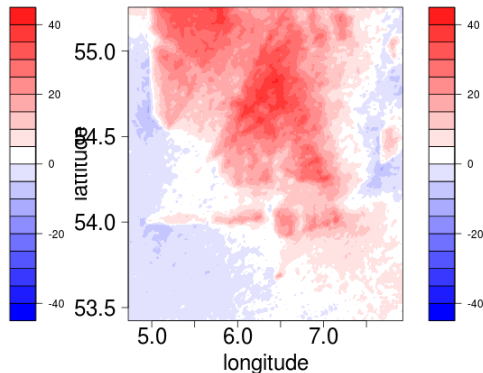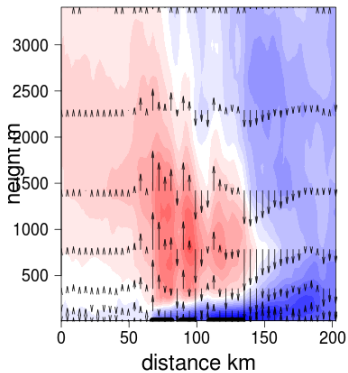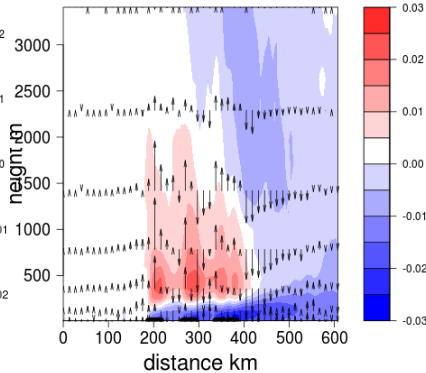
Conclusions

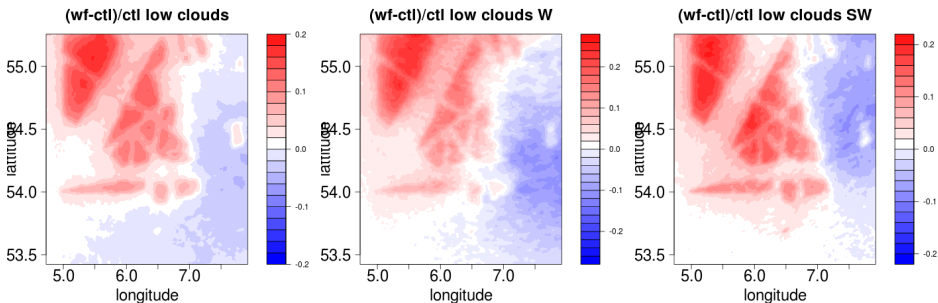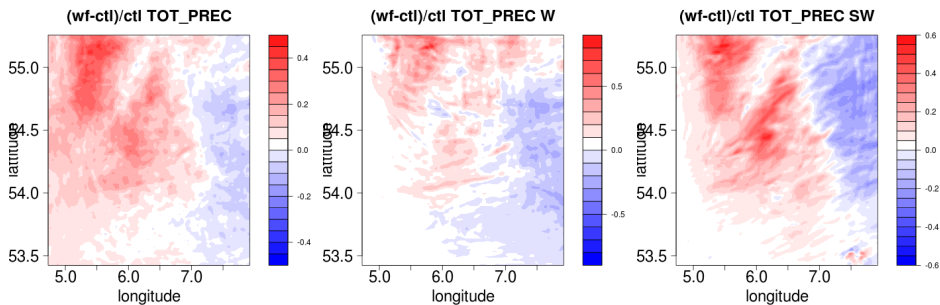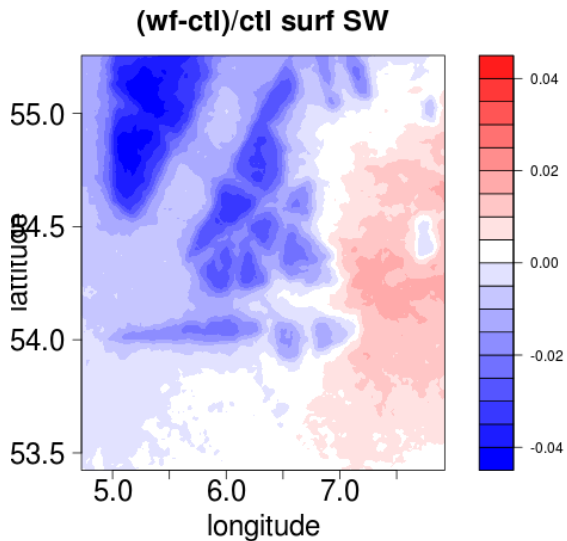- Comparison between CCLM and Fino1 show good correspondance
- Comparison between Fino1 and Stations are adequate
- Large discrepancies in wind direction between Quikscat and CCLM
- Wind Farms:decrease gradient in humidity, changes cloud cover

Acknowledgement

- BMWI for the FINO1 Data
- Ad Stoffelen, Andrew Stepek, for providing the scatteremoter data

stations and quikscat