



Modelling the impact of drifting snow on the surface mass balance of Adelie Land

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Introduction

- ▶ Adelie Land
 - ▶ Convergence zone and permanent snow surface
 - ▶ High frequency of drifting snow
 - ▶ Observations
 - ▶ Surface Mass Balance (SAMBA)
 - ▶ Drifting snow



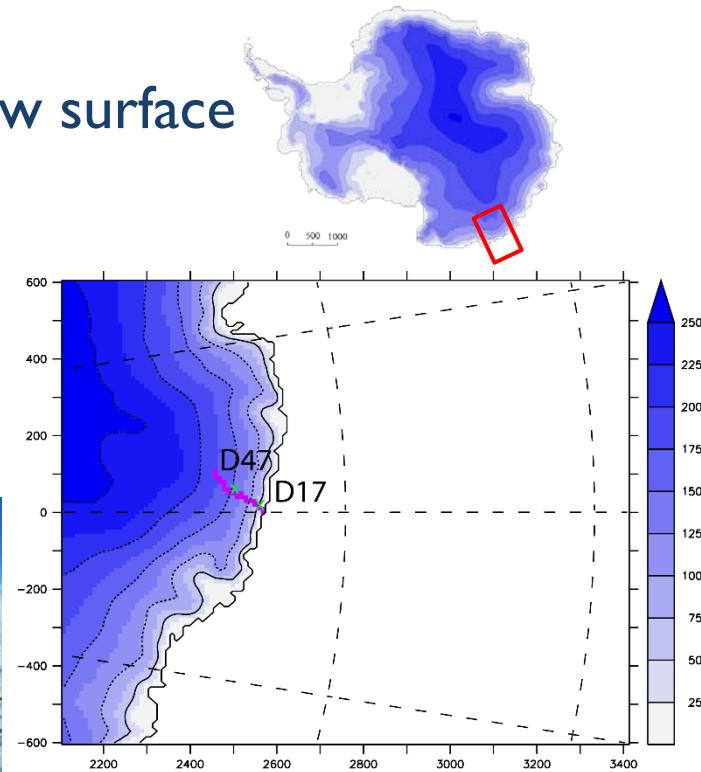
SMB (2004-2016)



D17 (2010-2016)



D47 (2010-2012)

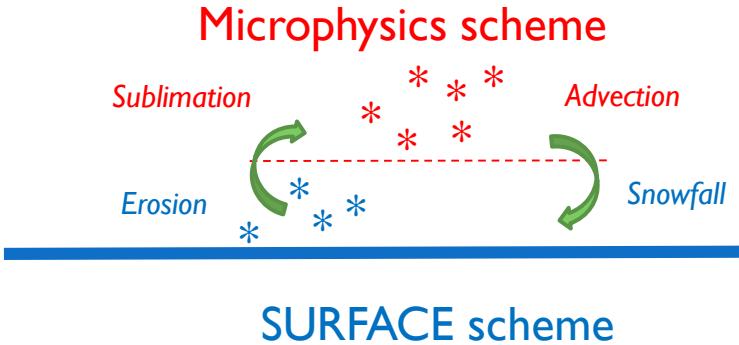


- ▶ Natural laboratory to study drifting snow in Antarctic

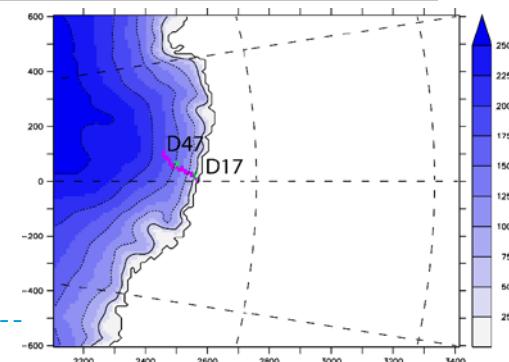
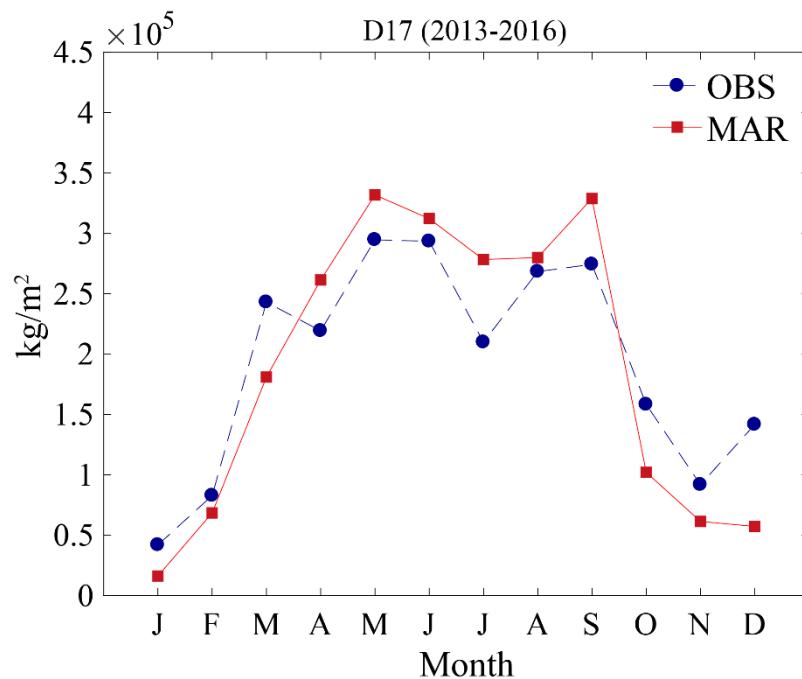
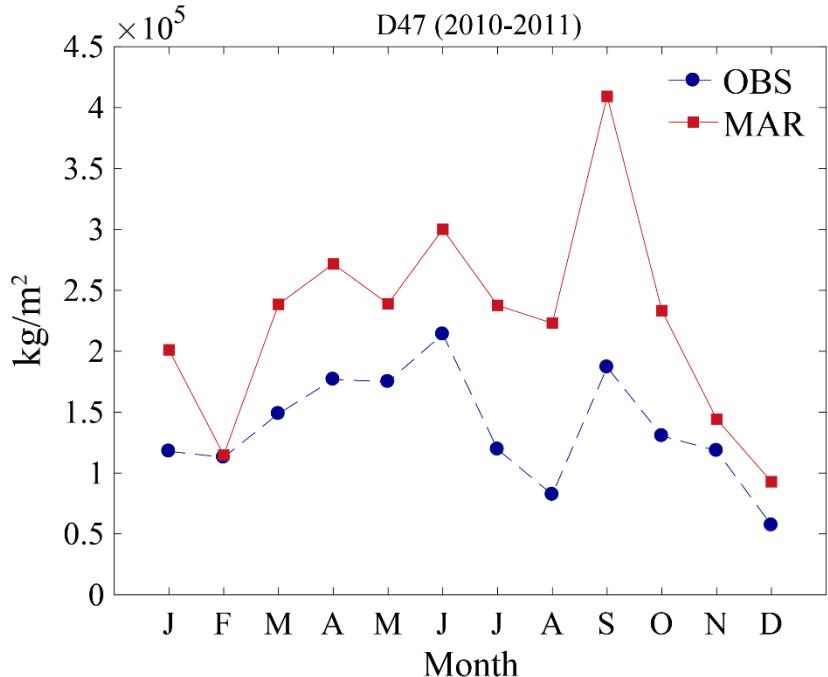
Methods

► Model

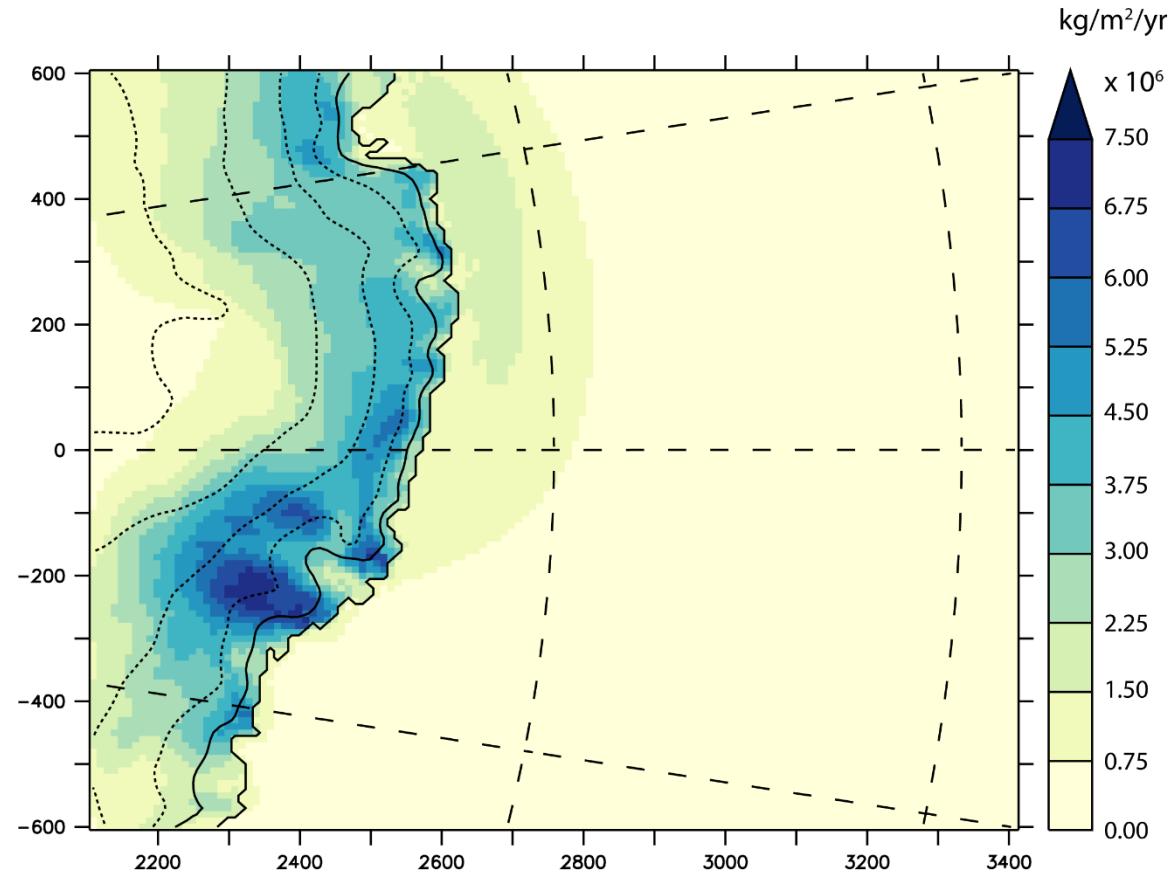
- The regional climate model MARv3.9
 - Developed for polar regions
 - Drifting snow routine
 - Interactive snowpack model
 - Horizontal resolution
 - 10km (first atmospheric level: 1m)
 - Forcing by ERA-Interim
 - 2002-2016



Evaluation of drifting snow results

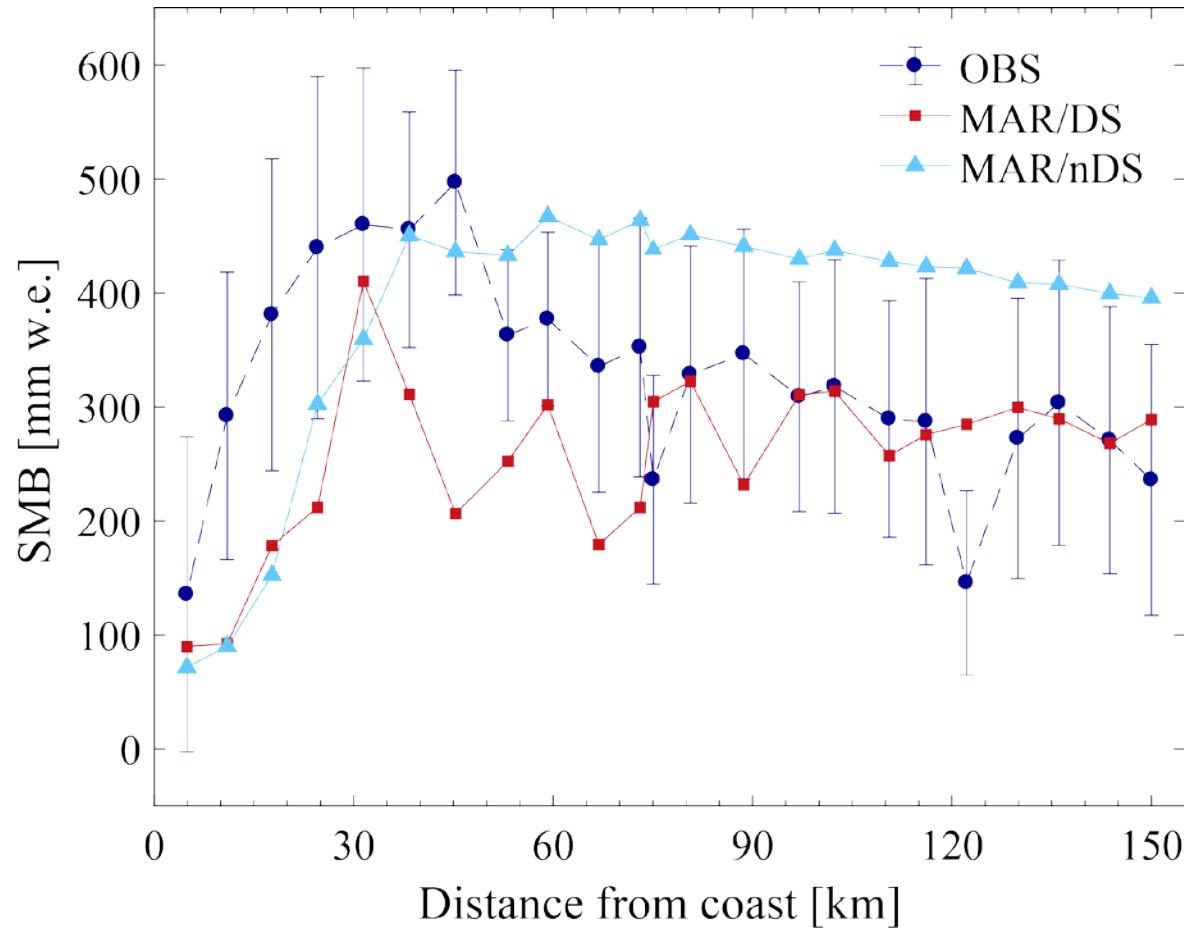


Snow mass transport

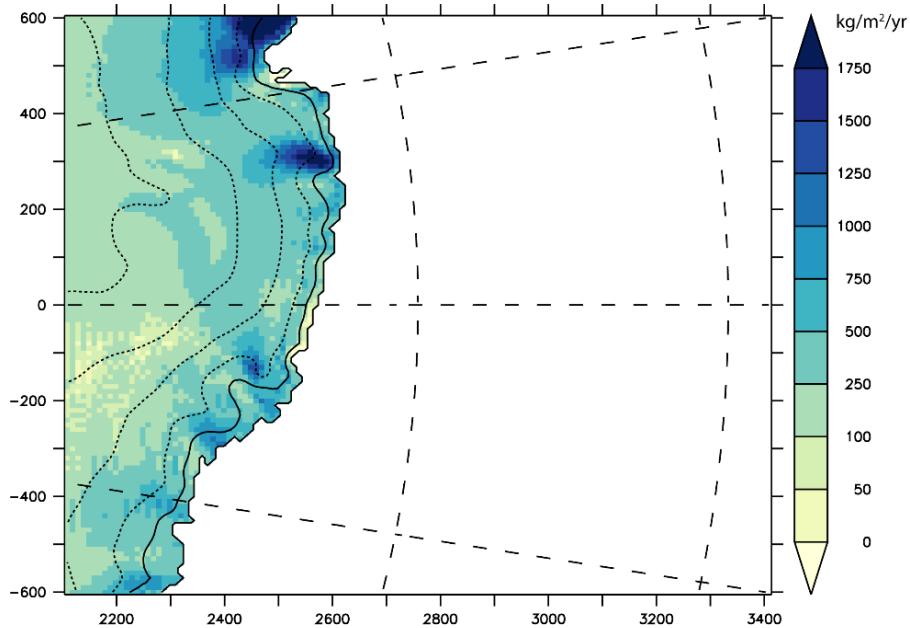


Annual mean snow mass transport between 0-2m (2004-2016)

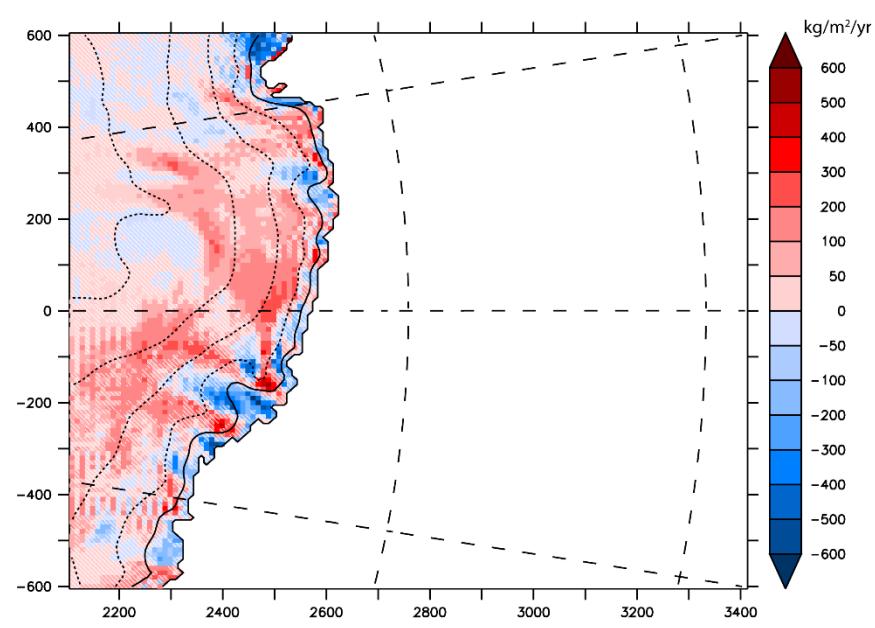
Evaluation of SMB results



Comparison of SMB with DS and NDS

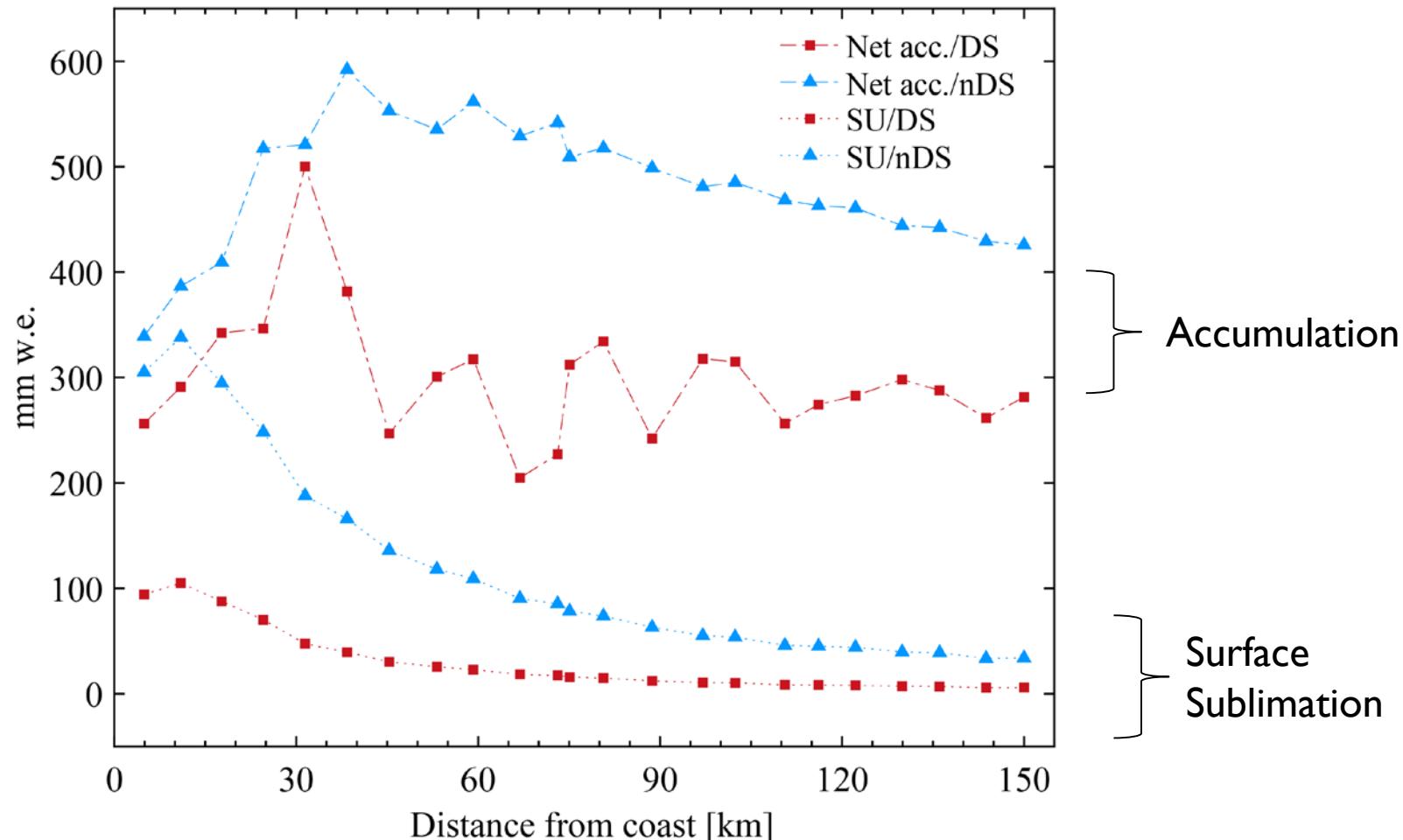


Mean annual SMB MAR/ds



SMB MAR/nds – SMB MAR/ds

Drifting snow and SMB components



Conclusion

- ▶ Influence of drifting snow on the SMB
 - ▶ Increase in the SMB variability
 - ▶ Erosion-Deposition processes have a significant impact on the SMB
 - ▶ Decrease in the surface sublimation
- ▶ Next steps
 - ▶ Quantify the export of drifting snow to the ocean and the drifting snow sublimation in the atmosphere
 - ▶ Assess the SMB at the continental scale with MAR and the drifting snow routine