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

- 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
  - **Microphysics scheme**
    - Sublimation
    - Advection
    - Erosion
    - Snowfall
  - **SURFACE scheme**
Evaluation of drifting snow results

[Graphs showing monthly comparisons of drifting snow results for two different periods, D47 (2010-2011) and D17 (2013-2016), with data points for OBS and MAR.]
Snow mass transport

Annual mean snow mass transport between 0-2m (2004-2016)
Evaluation of SMB results

![Graph showing SMB results](image)

Distance from coast [km]

SMB [mm w.e.]
Comparison of SMB with DS and NDS

Mean annual SMB MAR/ds

SMB MAR/nds – SMB MAR/ds
Drifting snow and SMB components

![Graph showing the relationship between distance from the coast and snow accumulation and sublimation. The graph includes lines representing net accumulation, net sublimation, and surface sublimation.](image_url)
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