

Workshop on "Falling and blowing snow at the poles and high mountains" – June, 18th 2018

Modeling and validating snowfall over Antarctica in the IPSL global climate model

Jean-Baptiste Madeleine (jmadeleine@lmd.jussieu.fr)
and many colleagues working on the LMD/GCM



Institut
*Pierre
Simon
Laplace*



Who are we ?

→ climate modelers working in Paris on the representation of Antarctic processes in the LMD/GCM (the atmospheric component of the IPSL-CM climate model)



Jean-Baptiste
Madeleine



Christophe
Genthon



Florentin
Lemonnier

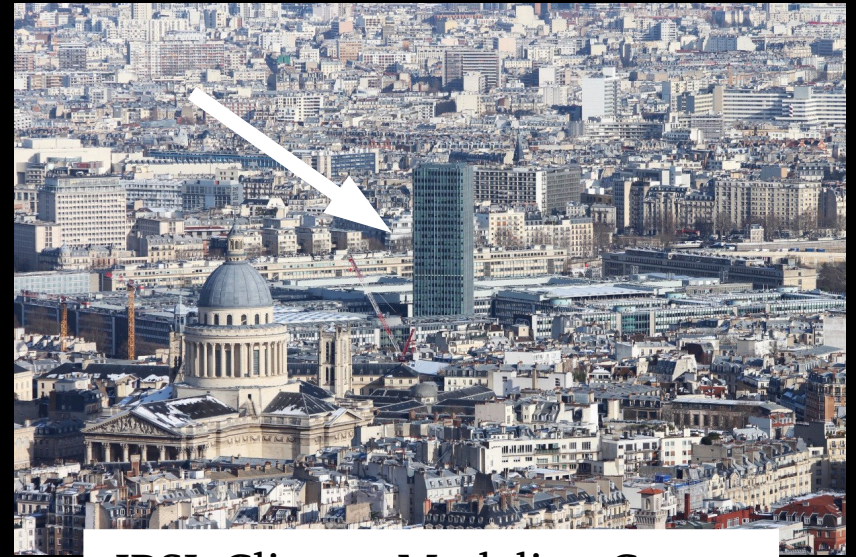


Jean-Louis
Dufresne

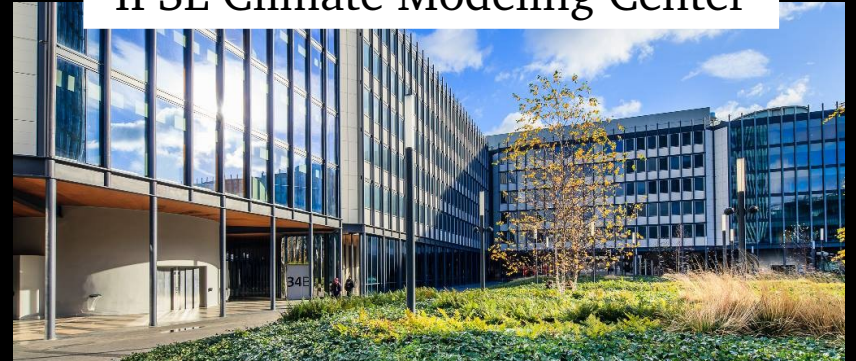


Frédéric
Hourdin

+ many collaborators who also work on our model, other models and on the observations (**APRES3** project : Alexis Berne, Claudio Durán-Alarcón, Jacopo Grazioli, Hubert Gallée, Gerhard Krinner, Chantal Claud, Etienne Vignon, Julien Beaumet, Constantino Listowski, Richard Forbes, , Cécile Agosta, Martin Ménégoz...)



IPSL Climate Modeling Center

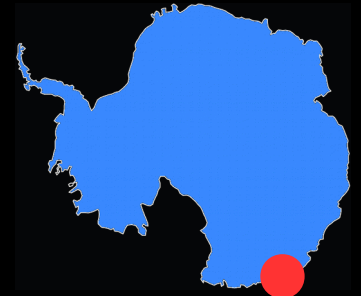
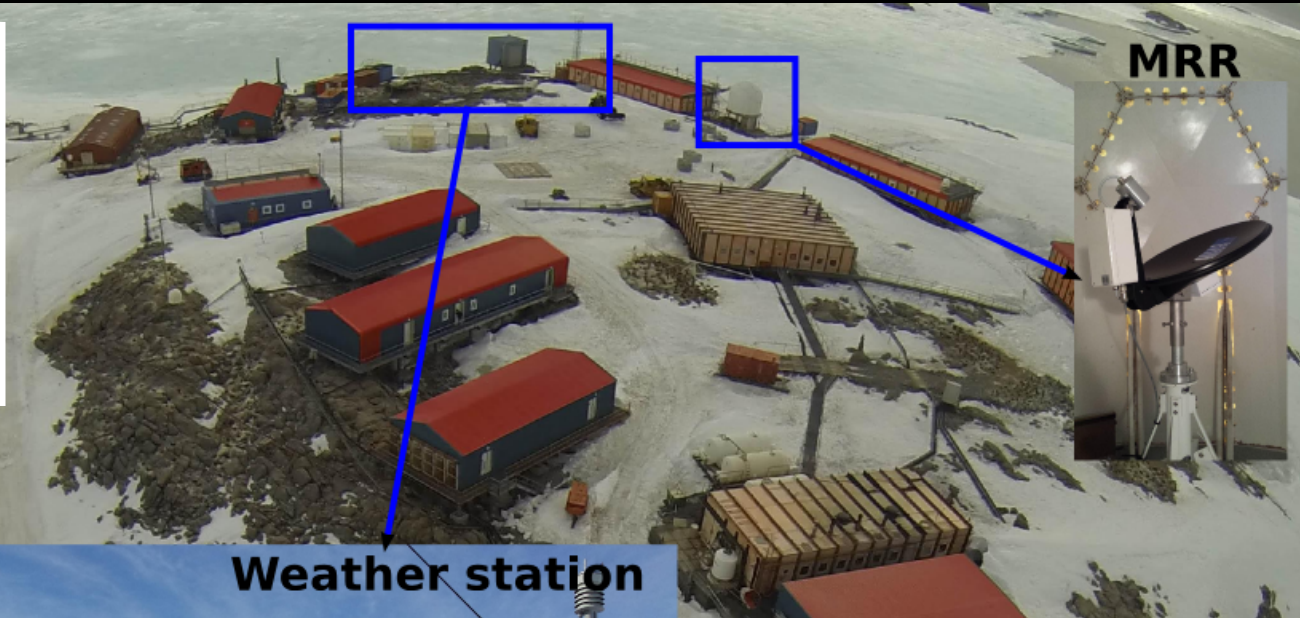


IPSL stands for “Institut Pierre Simon Laplace” - it is a climate institute that brings together 9 laboratories in Paris; around 80 scientists and engineers work on developing and validating the different model components.

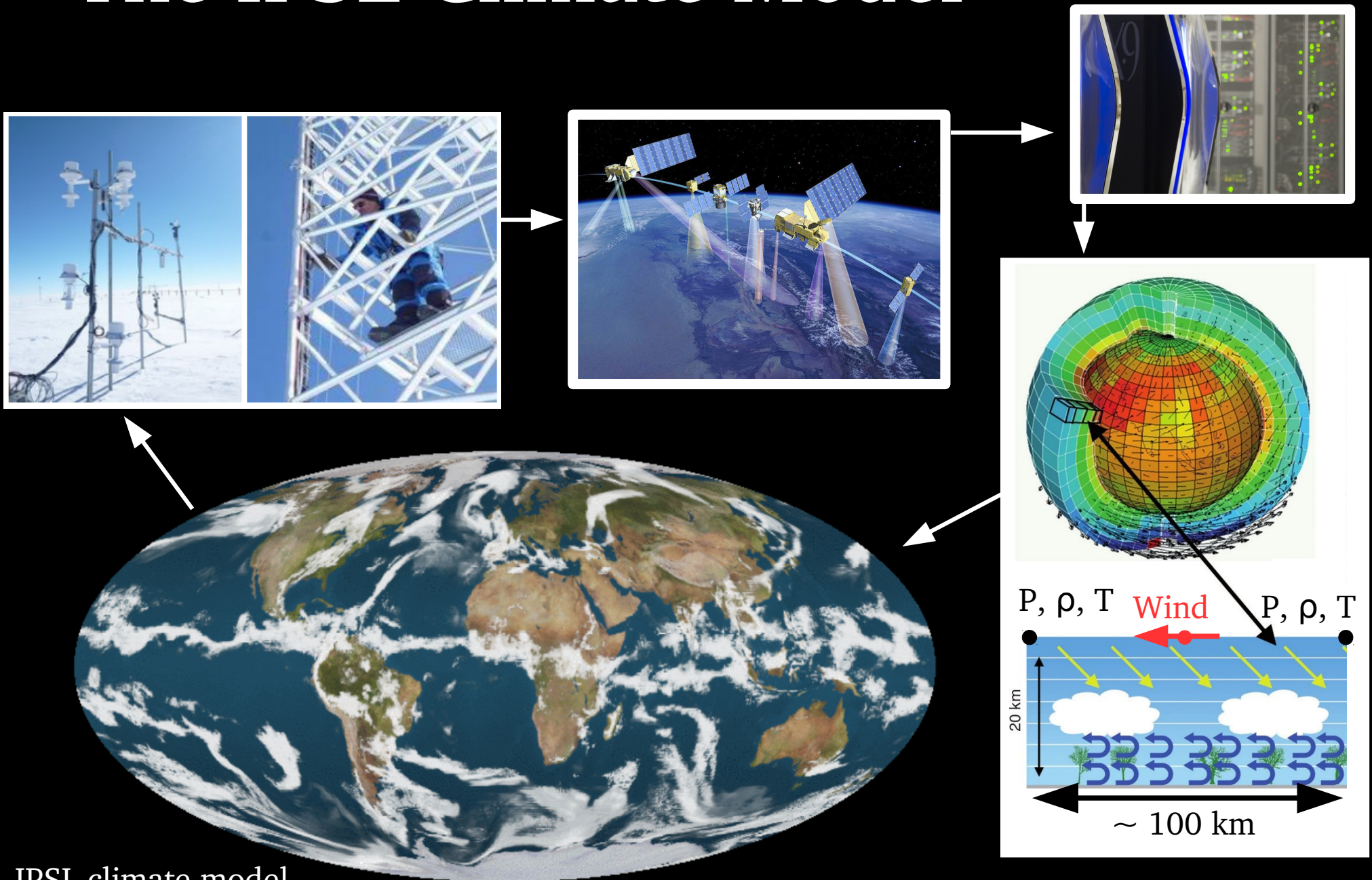


Observing clouds and snowfall in coastal Antarctica

APRES3
ANR
project
(French-
Swiss !)



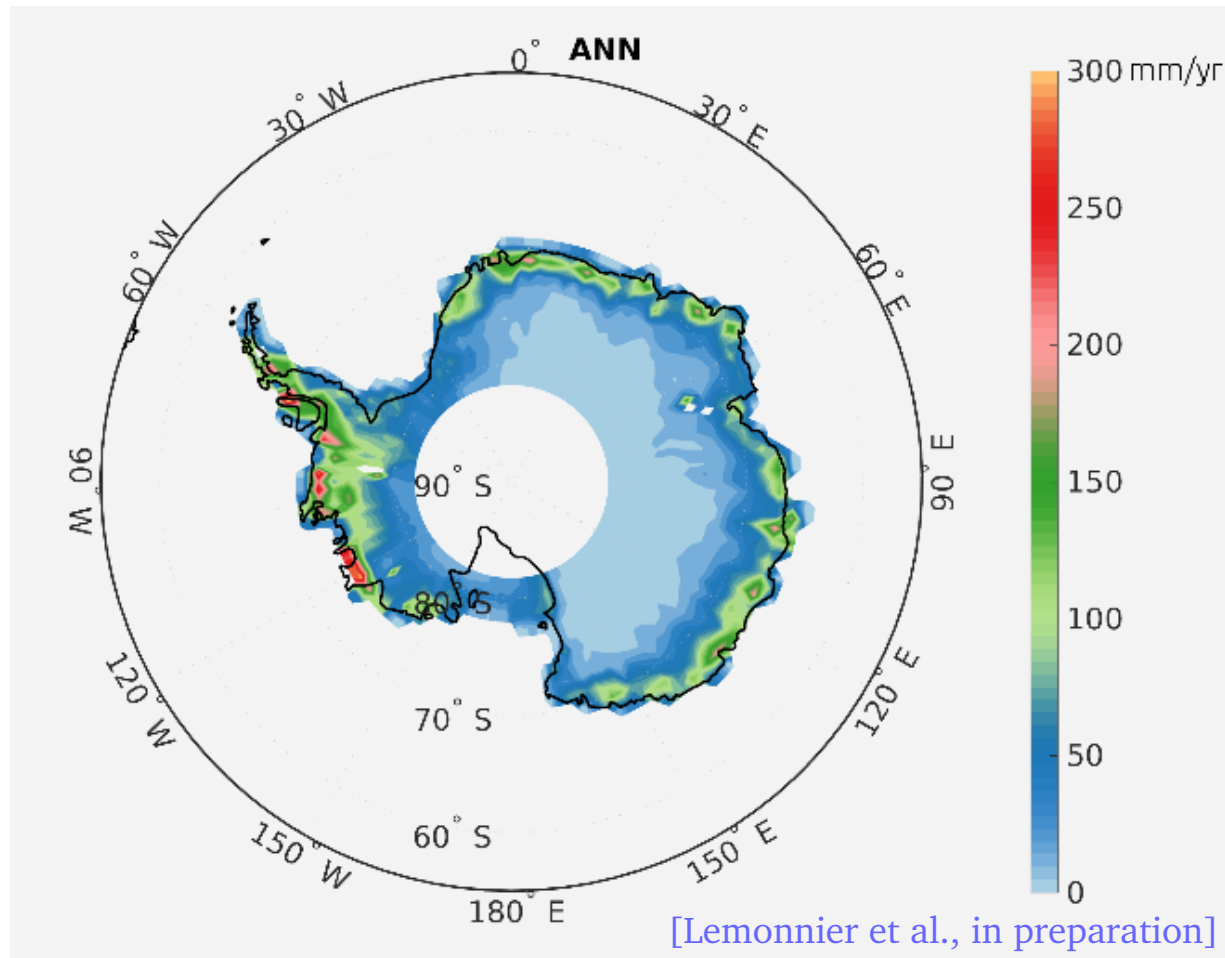
The IPSL Climate Model



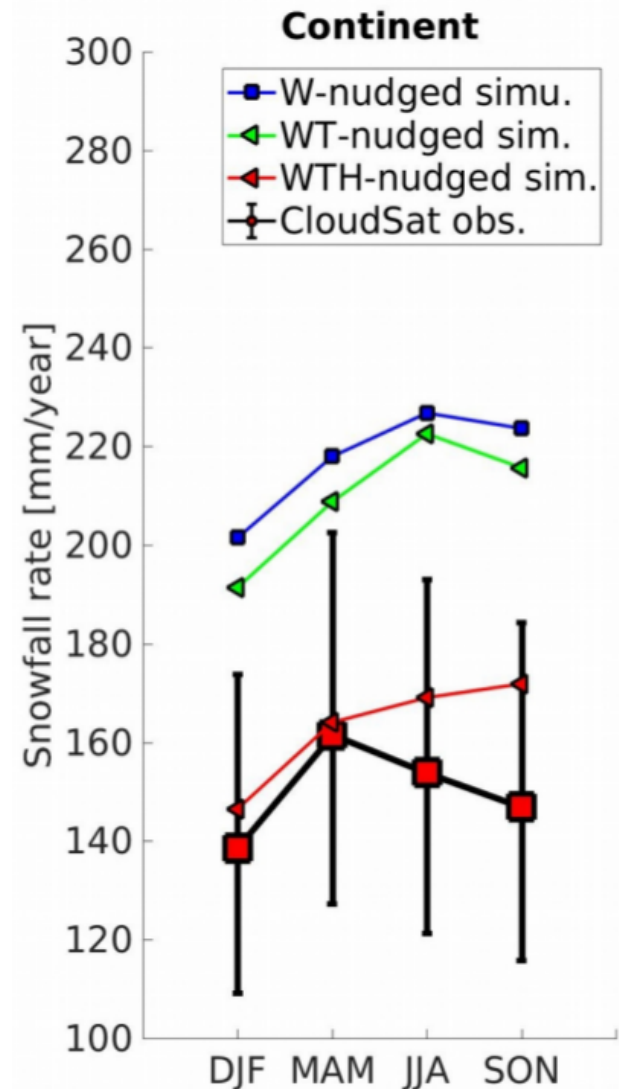
Some aspects of the model we are working on for Antarctica :

- Cloud microphysics (mixed-phase clouds, supersaturation...) → J-B Madeleine, F. Lemonnier, C. Genthon
- Solid precipitation → F. Lemonnier, J-B Madeleine, C. Genthon
- Blowing snow → C. Genthon
- Stable boundary layers → E. Vignon, F. Hourdin, C. Genthon
- Cloud radiative effects → J-L Dufresne, J-B Madeleine
- Long-term predictions → G. Krinner, F. Hourdin

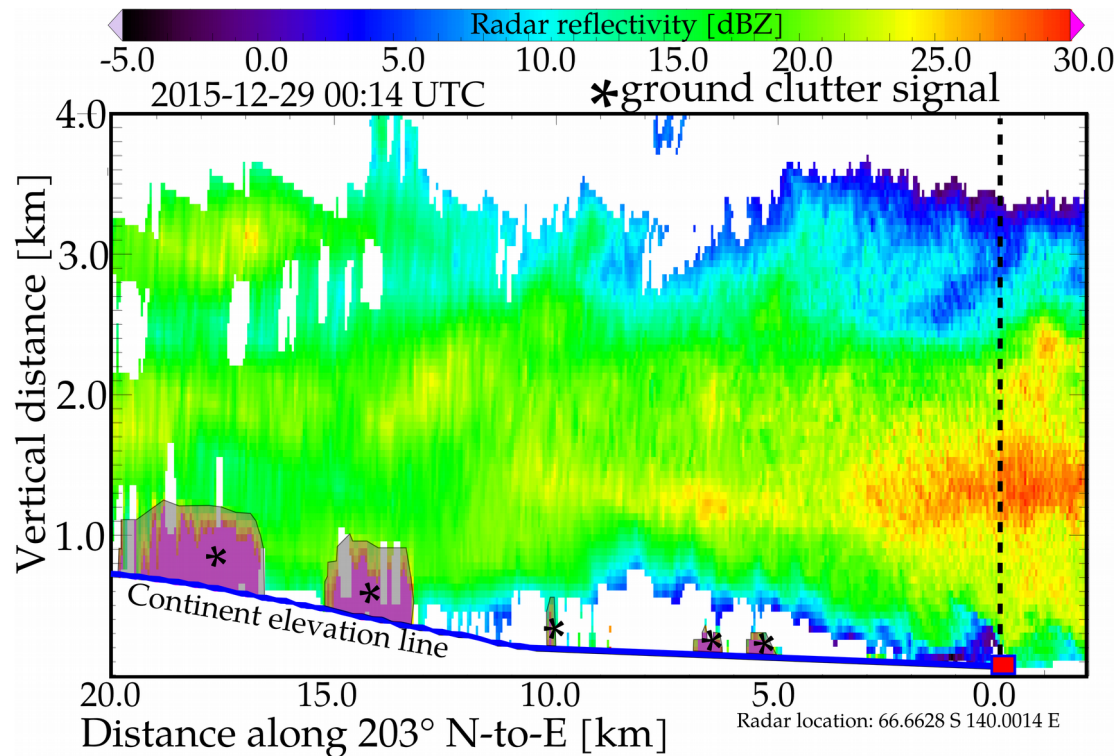
Comparison to CloudSat retrievals



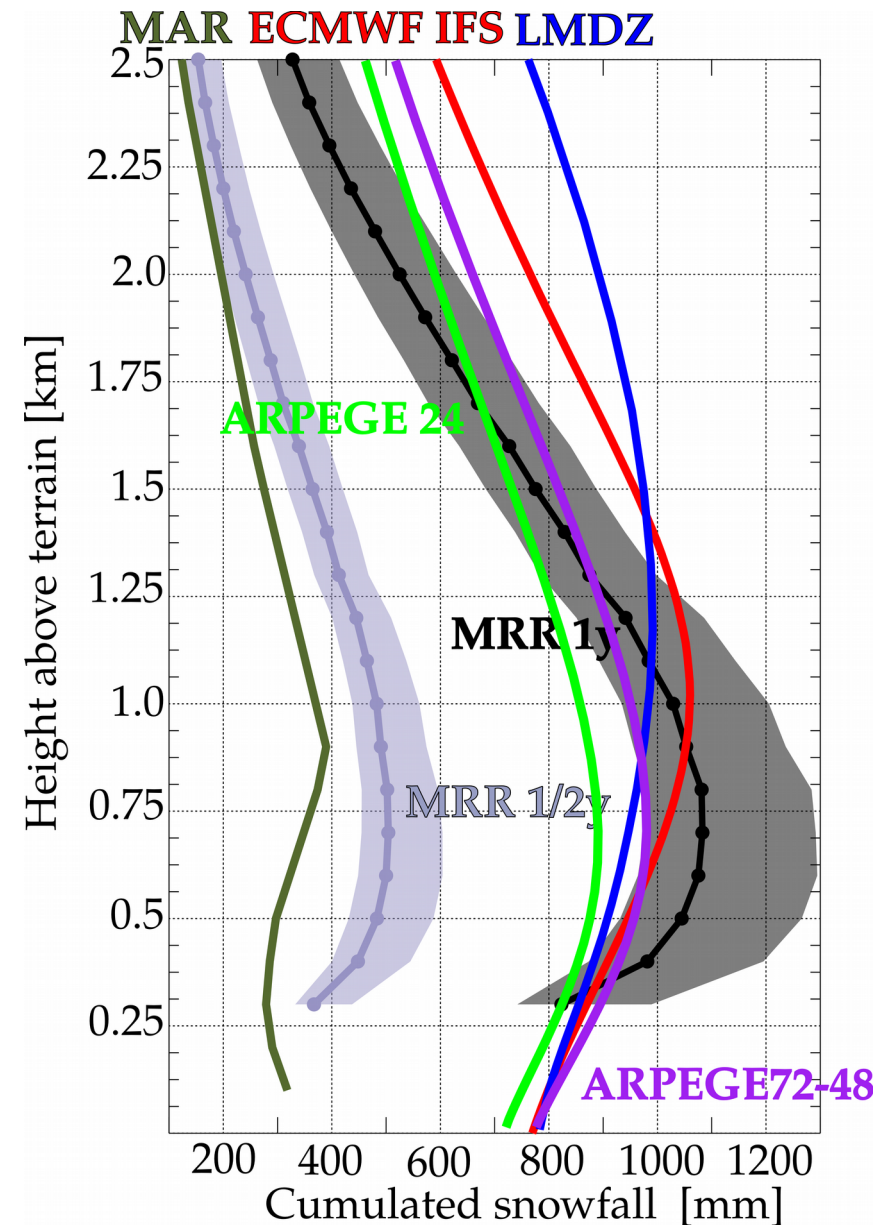
See Florentin Lemonnier's poster
n°8_AC-2_746 on Wednesday



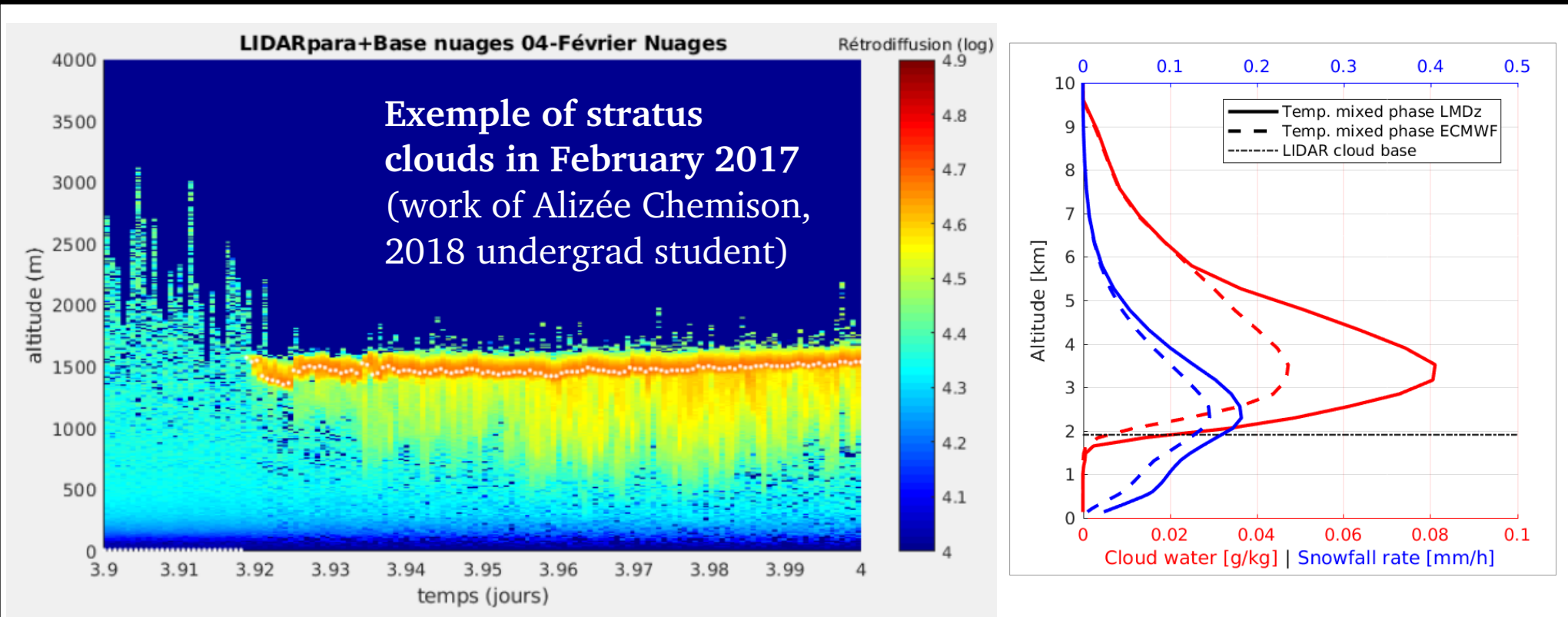
Model intercomparison



See Alexis Berne's talk n°449 and Florentin Lemonnier's talk n°739 on Friday morning

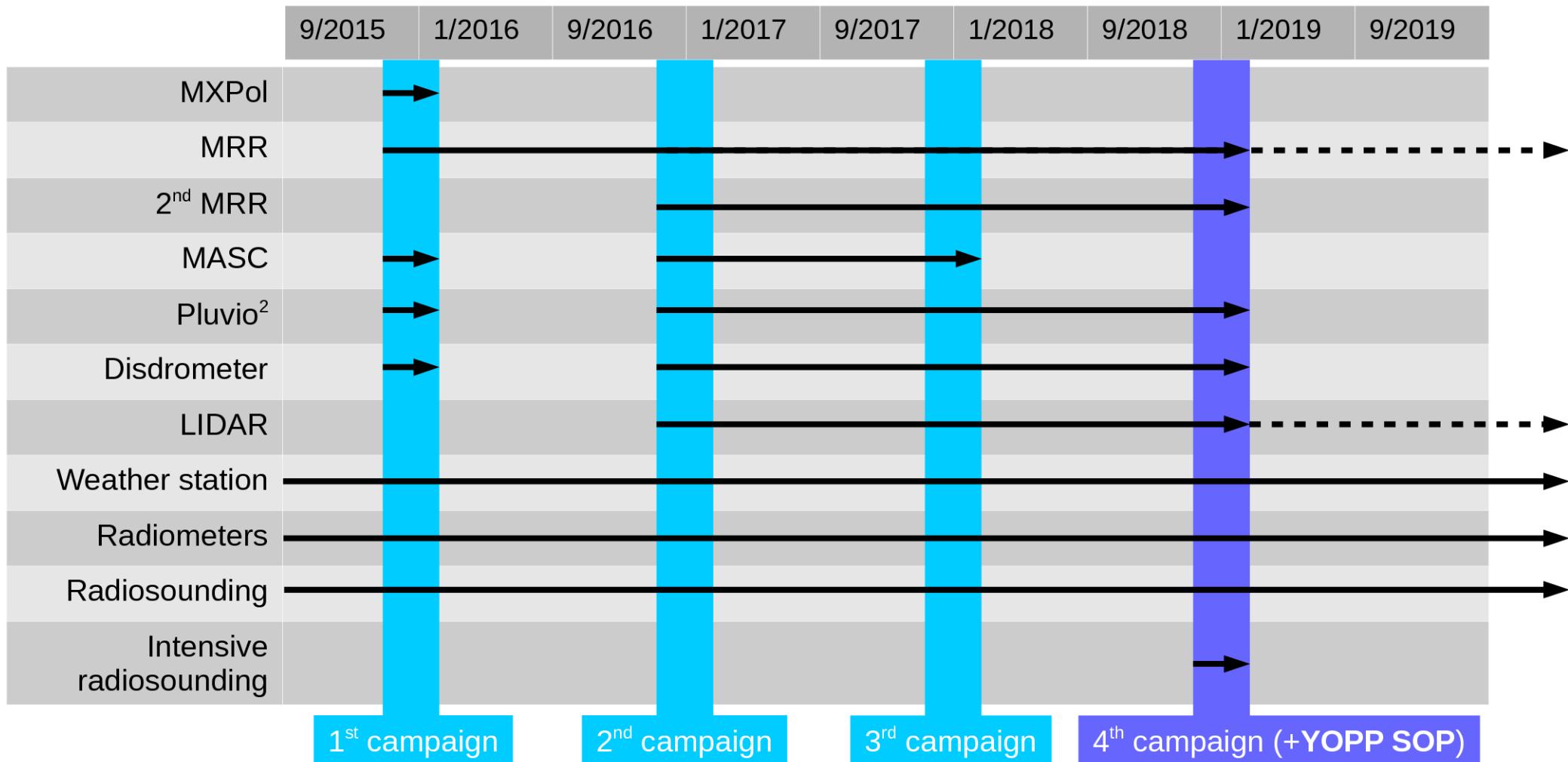


LIDAR measurement of cloud-base height for GCM validation



See Claudio Durán-Alarcón's poster n°36_AC-1_738 tomorrow night

APRES3 project : Planned activities



Summary

- Validation of cloud amount and phase using Calipso-CloudSat and LIDAR observations
- Improved cloud microphysics
- Validation of snowfall rates using CloudSat retrievals (in 3D) and MRR data
- Better representation of snowfall in the LMD/GCM ; inclusion of blowing snow

Possible synergies

- Define together a series of diagnostics to evaluate precipitation in CMIP6 models
- Share small datasets (for example annual means easily comparable to GCM results)