



Modélisation de la variabilité et des tendances climatiques en Himalaya pour une meilleure compréhension de leurs impacts sur la cryosphère

Mickaël Lalande

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Directeurs : Gerhard Krinner et Martin Ménégoz
Institut des Géosciences de l'Environnement (IGE)

PEDALONS 13.01.2020 "Zoom et climats régionaux"

Cursus universitaire

Expériences personnelles

3 mois en
Nouvelle-Zélande

1 an en VVT au Japon

Auto-entreprise
développement web
→ programmation

→ Anglais

Passion pour la Science et
l'Environnement

Expériences professionnelles

Prépa PCSI/PSI

Supméca Paris
→ ~~ingénieur~~

L3 STPE/Physique
-> recherche plus fondamentale

Stages glaciologie +
astrophysique

Stage atmosphère

Master ACSC

→ atmosphère / cryosphère / modélisation

Stage océan + machine learning
→ complémentaire à ma formation
→ soumission d'un papier

Projet de thèse autour de la **modélisation
atmosphère/cryosphère** et du
réchauffement climatique

CMIP6

vers CMIP7

1ère année

2ème année

3ème année

après...

- Bibliographie
- Prise en main du LMDZ
- Novembre : réunion atmosphère/orchidée
- Décembre : formation LMDZ
- 1ère simus + comparaisons

- Paramétrisation sous-maille
- Développement LMDZ (collaboration avec l'IPSL)
- Comparaison CMIP6
- Terrain Himalaya ?
- Visite BSC ?

- Projections futures (+ avec correction de biais ?)
- MAR dans LMDZ ?
- Finalisation de la thèse
- Ecriture du mémoire

- Post-doc à l'étranger
- Continuer dans la recherche
- Continuer de me spécialiser dans la modélisation atmosphère/cryosphère

For now...

01/10/2019
Start PhD

23-25/10/2019
Formation
Fortran Base

14-15/11/2019
Journée de Modélisation
des Surfaces
Continetales

26-29/11/2019
Formation
Fortran Avancé

9-11/12/2019
LMDZ training
course

13/01/2020
PEDALONS
zoom

14-17/01/2020
IPSL running
environment +
ORCHIDEE training
course



Formations Fortran : documentation

Fortran_Base : "Fortran : notions de base" (1er niveau) :

- Support de cours :
 - Version française
- Exemples du cours (source des programmes) :
- Exemples du support
- Travaux pratiques :
- Travaux pratiques avec solutions

Fortran_Avancé : "Fortran : apports des normes 90 et 95 avec quelques aspects de la norme 2003" (2ème niveau) :

- Support de cours :
 - Version française
- Travaux pratiques :
- Travaux pratiques avec solutions



Vous êtes ici : Accueil / Le coin des développeurs / Réunions PEDALONS / 2020/01/13

2020/01/13

Réunion PEDALONS du 13 janvier 2020. Utilisation du zoom pour l'étude des climats régionaux

JMSC-2019 : Journées de Modélisation des Surfaces Continentales, 14-15 novembre 2019

posted by Rédacteur actif | ven, 04/10/2019 - 17:26

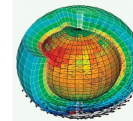


JMSC-2019 : 3^{èmes} Journées de Modélisation des Surfaces Continentales
14-15 Novembre 2019, Paris

LMDZ training course : 9th, 10th, 11th of december 2019

LMDZ training course, december 2019

corridor 45-55, 2nd floor, room 201 / Laplace
Sorbonne Université
Faculté des Sciences et Ingénierie
4 place Jussieu 75005 Paris, France



Map:

ORCHIDEE training course

Next session

- Training course 16th-17th January 2020, at IDRIS

Next training session will take place on the 16th-17th January 2020 at IDRIS in Orsay outside Paris. See here how to reach IDRIS: <http://www.idriss.fr>
The training will be held in english and includes lecture and hands on sessions. The hands on sessions will be done on the IDRIS training computers
Don't forget to bring your ID-card each day for entrance in the IDRIS building !

The ORCHIDEE training is preceded by a 2-days training course in IPSL running environment for beginners the 14th-15th of January 2020.

Program for ORCHIDEE training

Thursday 16th January 2020

09:30 - 10:00 : Welcome presentation (Philippe Peyign)
10:00 - 11:10 : Introduction to ORCHIDEE 1/2 (Nicolas Vuichard)
11:00 - 11:30 : Break
11:30 - 12:00 : Introduction to ORCHIDEE 2/2 (Nicolas Vuichard)
12:30 - 14:00 : Lunch in the IDRIS "cantine" employers restaurant
14:00 - 17:00 : Hands on session and technical presentations

Friday 17th January 2020

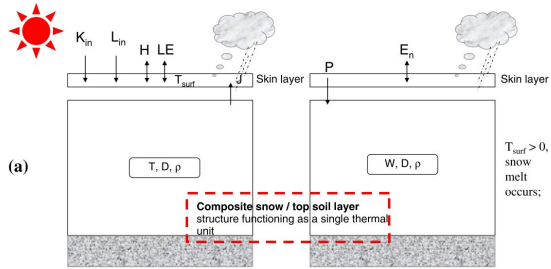
09:30 - 10:20 : Soil hydrology (Agnès Duchame)
10:20 - 11:10 : Soil carbon (Bertrand Guenet)
11:00 - 11:30 : Break
11:30 - 12:00 : Snow and soil freezing (Catherine Orsi)
12:30 - 14:00 : Lunch in the IDRIS "cantine" employers restaurant
14:00 - 17:00 : Hands on session and technical presentations



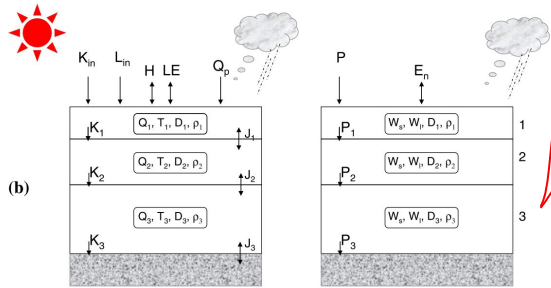
ORCHIDEE
LAND SURFACE MODEL

Snow bias in IPSL model CMIP5 versus CMIP6

WANG ET AL.: ORCHIDEE SNOW MODEL EVALUATION



K_{in} (short wave radiation), L_{in} (longwave radiation), H (sensible heat flux), LE (latent heat flux), J (conduction heat flux), W (SWE), D (snow depth), ρ (fixed snow density, 330), P (precipitation), E_n (evaporation), T (snow temperature), T_{surf} (skin layer temperature)



K_{in} (short wave radiation), L_{in} (longwave radiation), H (sensible heat flux), LE (latent heat flux), J (conduction heat flux), Q (snow layer heat content), Q_p (advective heat from rain and snow), W (snow layer SWE), W_l (snow layer liquid water content), D (snow layer depth), ρ (snow layer density), P (precipitation), E_n (evaporation)

Fig. 1 Wang et al. 2013

CMIP5

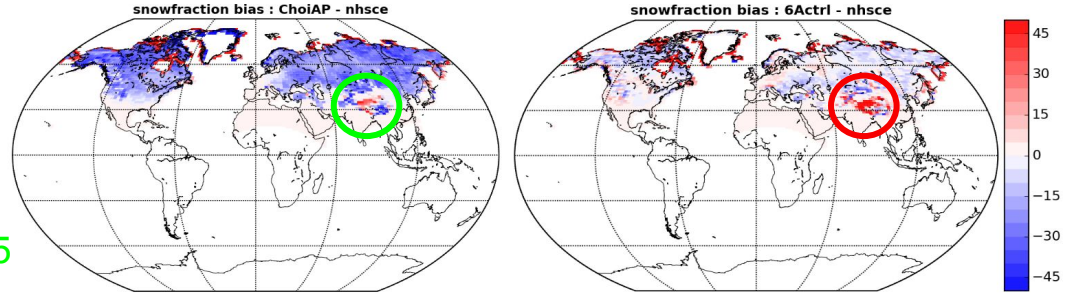


Fig. 6 Cheruy et al., submitted

CMIP6

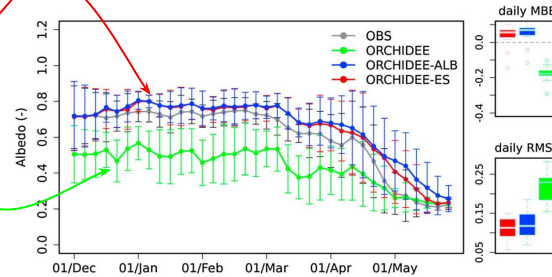


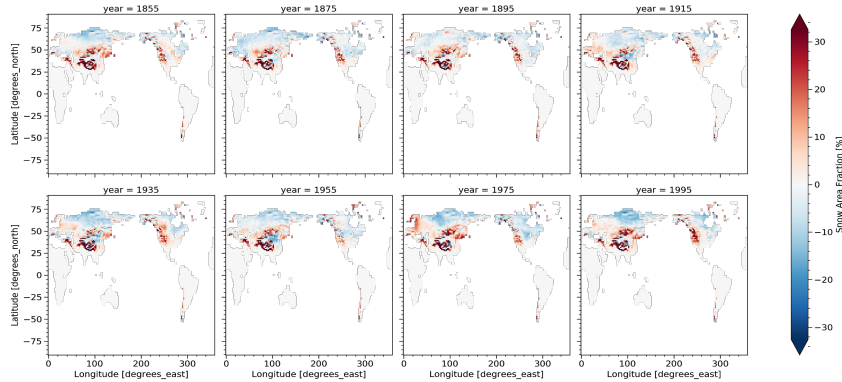
Fig. 5 Wang et al. 2013

“The weaker bias produced by the old snow scheme is consistent with the underestimation of the snow albedo already documented by T. Wang et al. (2013).”

[Cheruy et al., submitted]

Snow bias over Himalaya in IPSL_CM6A_LR_historical

- From when the bias is present and is this present in the ensemble mean?

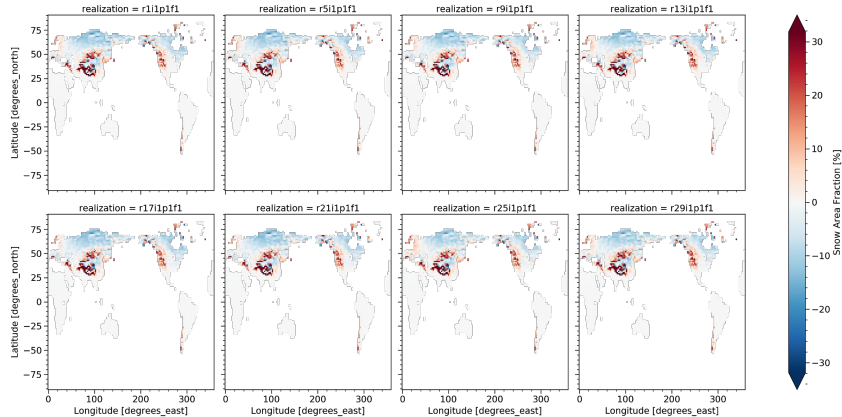


Ensemble mean of the 32 realizations (averaged per year)

NOAA-CIRES Twentieth Century Reanalysis (V2c)

- The bias is always present! Even before the decrease in snow area fraction (20th century). Similar results with other reanalyses.

- Is this bias present for all members?



Climatology 1979 to 2014 (for each realization)

NOAA-CIRES Twentieth Century Reanalysis (V2c)

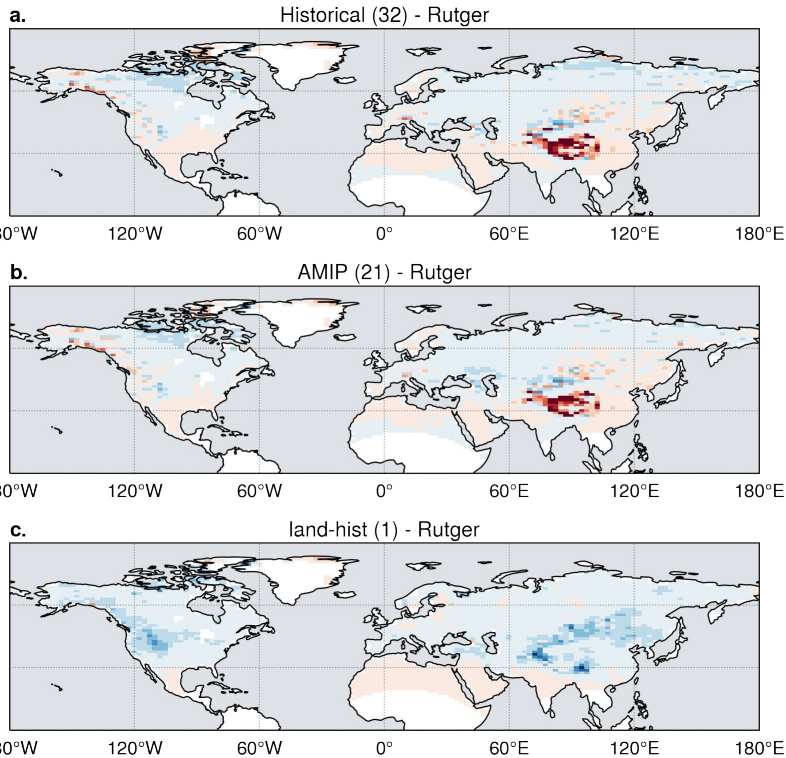
- The bias is present for all members! Similar results with other reanalyses.

Snow bias over Himalaya in IPSL_CM6A_LR_historical

- Is the snow bias over Himalaya present in all experiments: historical, AMIP and land-hist?

Climatology bias: 1981-2014 / Realization: ensemble mean

Ensemble mean climatology (1981-2014)



NOAA Climate Data Record (CDR) of Northern Hemisphere (NH) Snow Cover Extent (SCE), Version 1 (based on satellite-derived maps)

→ The bias is present only in Historical and AMIP, but not in land-hist!

Further analyses:

- Check precipitations (liquid/solid), winds, trends?
- Check HighResMIP / CMIP5 / other models?
- Compare with more:
 - obs (GLACIOCLIM + others? Make a 1D case over Himalaya?)
 - reanalyses (ERA5 not good? [Orsolini et al, 2019], ERA-Interim, JRA-55, MERRA-2, etc.)
- More bibliography (on reanalyses/obs, Himalaya, physics, etc.)
- Make an analysis on thermodynamic/dynamic changes with analog method [Deser et al., 2016]

Future work?

[Cheruy et al., submitted]

*“The **weakening of the bias** obtained with the **increase in resolution** or with the wind nudging confirm that the regional circulation is an important component of the High-Mountain Asia climate which can be simulated correctly only when using fine resolutions (Sabin et al., 2013; Ménégoz et al., 2014; Krishnan et al., 2019).”*

→ à vérifier avec la nouvelle version du schéma de neige (CMIP6) ? Simu zoomée sur l'Himalaya similaire à celles citées ci-dessus avec nudging pour comparaison avec obs ?

*“It is also a way to better simulate the role of the **orographic barrier** played by the High-Mountain Asia that stops the northward transport of moisture originating from the Indian subcontinent. This barrier explains the dryness of the Tibetan plateau where an excess of moisture flux is simulated at coarse resolution, inducing a **positive bias of snow cover** finally enhanced by surface feedback.”*

*“The snow scheme of intermediate complexity implemented in ORCHIDEE leads to a better description of snow cover on the continents. Mountainous regions and in particular the **Tibetan Plateau and High Mountain Asia remain challenging** because radiative feedbacks and an imperfect description of the circulation in these regions at regional scale induce a **strong cold bias**. Further refinements of the snow scheme over complex terrains and of the atmospheric circulation are required to reduce these biases.”*

→ paramétrisation sous-maille pour diminuer ce biais dans les simulation non zoomées ?
(schéma de neige, effet orographique, autres ?)