HIGH LATITUDE PROCESSES
I. Gouttevin, B. Ringeval, C. Koven, T. Wang, C. Yue, G. Krinner, P. Ciais, C. Ottlé, P. Fridlingstein...

ORCHIDEE_HIGH_LAT :

permafrost processes in the AR5 version

Official ORCHIDEE AR5

MERGE (step II)

« ORCHIDEE AR5 Charlie Koven » (June 2010)

OM insulation, cryoturbation, methanogenesis, microbial heat (caveats!), O2 limitation(caveats!), vertically discretized soil C, Thermal soil freezing from Poutou et al., 2004

ORCHIDEE_HIGH_LAT

Bruno Ringeval
TopModel, wetlands (separate methanogenesis scheme)

Isabelle Gouttevin
Freezing in the multi-layer hydrology

Available on the ORCHIDEE-SVN server to developers :
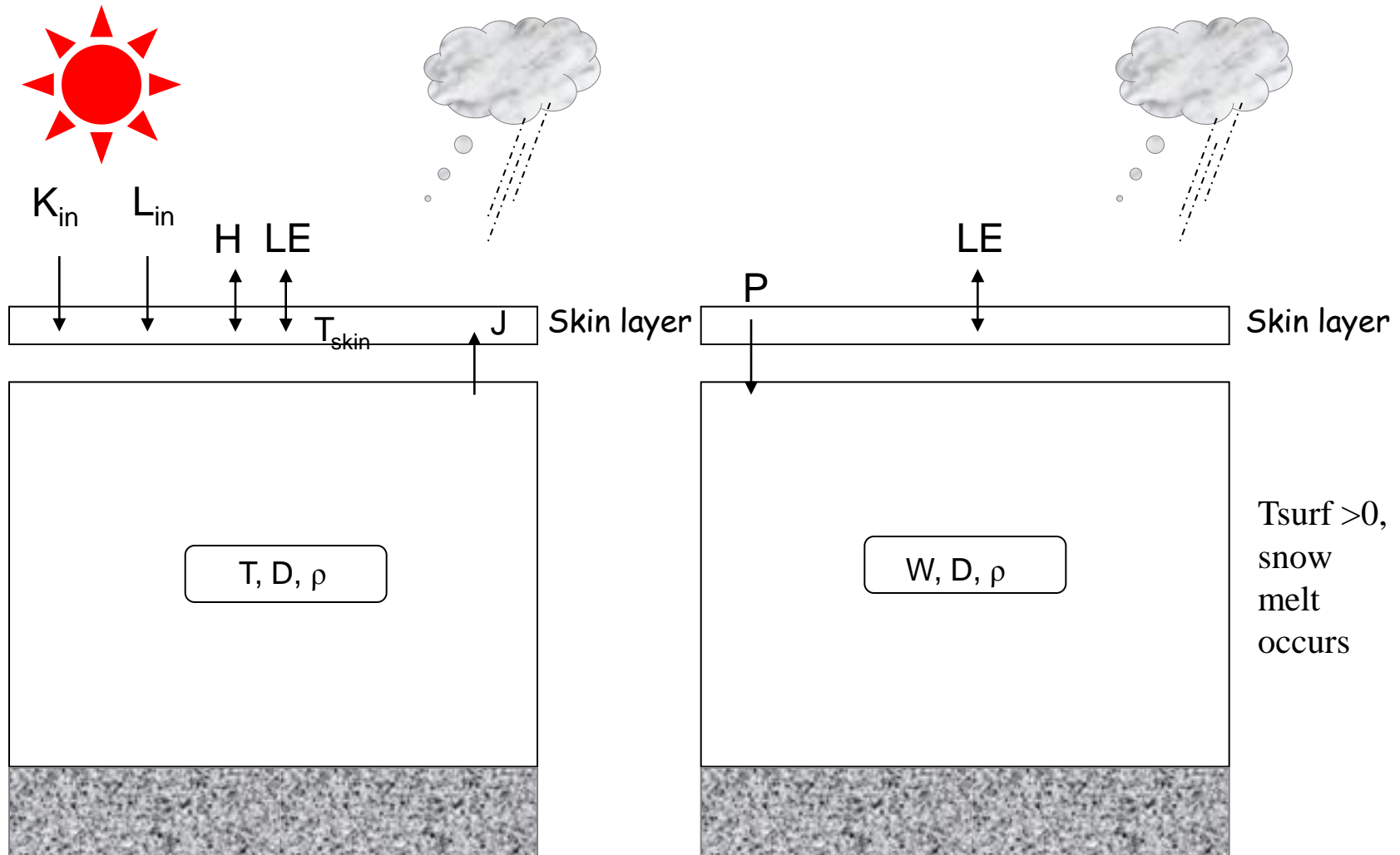C. Ottlé, G. Krinner, WangTao, Yue Chao …

- Future **integration of snow and fire** modules (Tao and Chao)

- **Compatibility with stomate** numerically restored but no tests performed: maybe the formulation of the hydric stress will have to be revised

- **Compatibility with LPJ** to be tested (Tao)

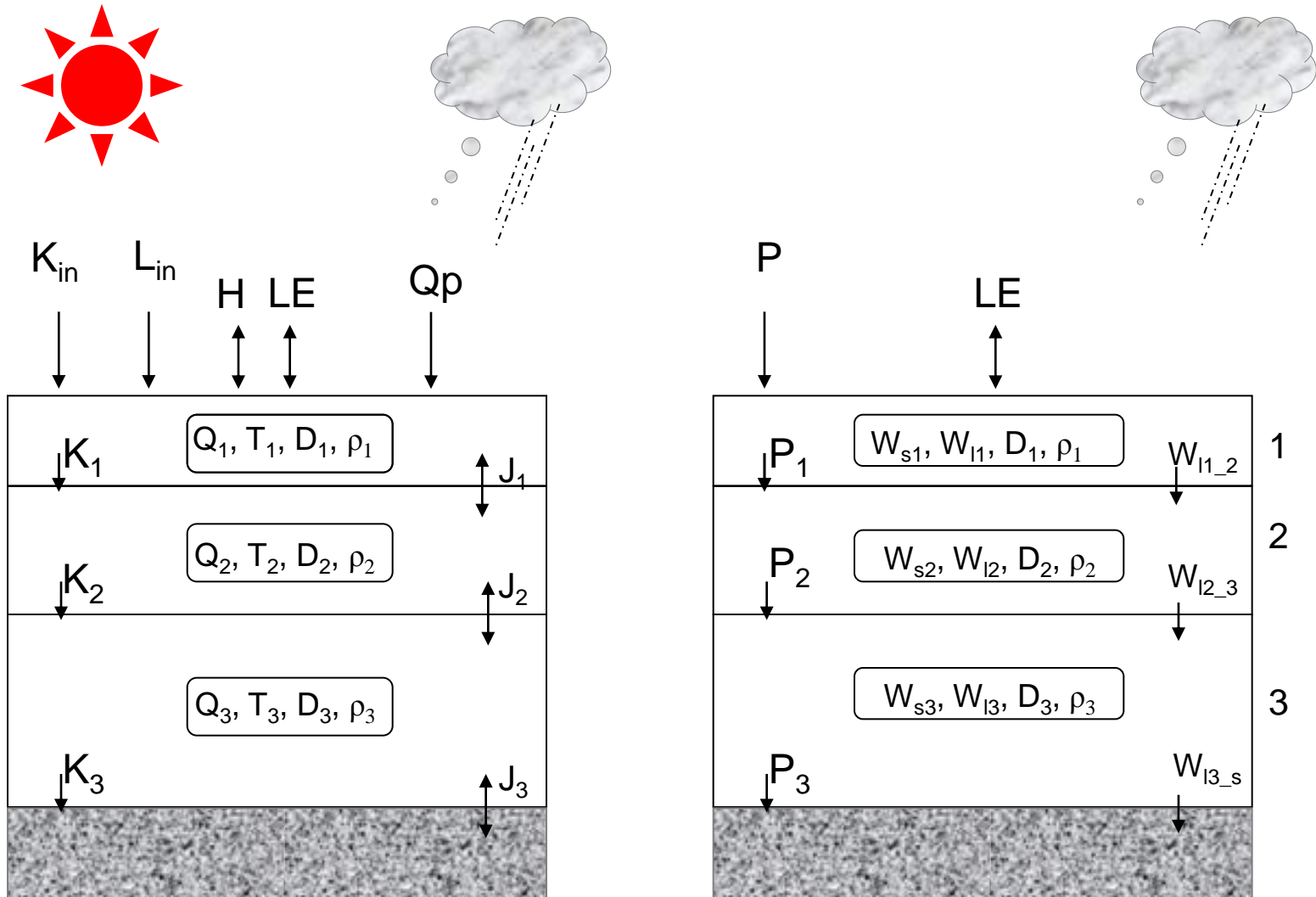- Redundancy or complementarity of the **methanogenesis schemes** by Charlie and Bruno ?

Default ORCHIDEE Snow module (ORC-O)

Kin (incoming short wave radiation), Lin (incoming longwave radiation), H (sensible heat flux), LE(latent heat flux), J (conduction heat flux), W (snow layer SWE), D (snow layer depth), ρ (constant snow layer density) , P (precipitation), T(snow temperature), Tskin(skin layer temperature)
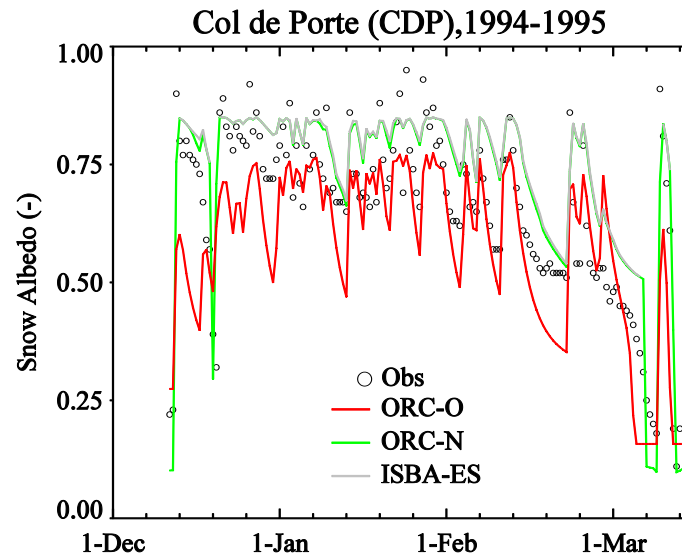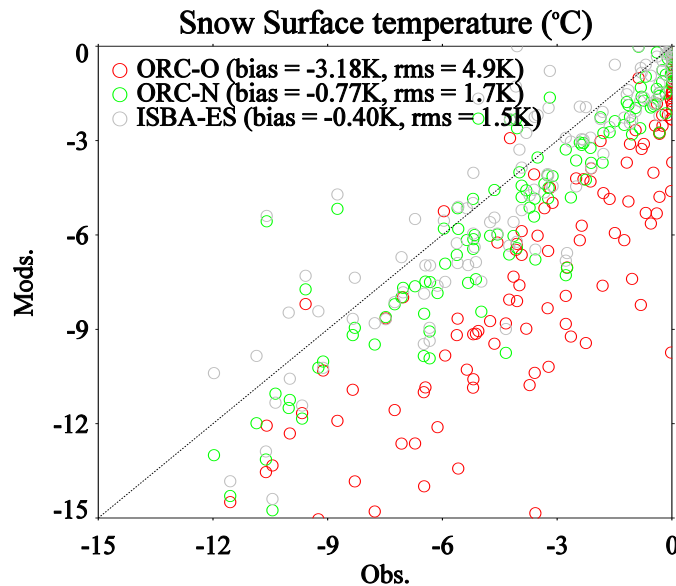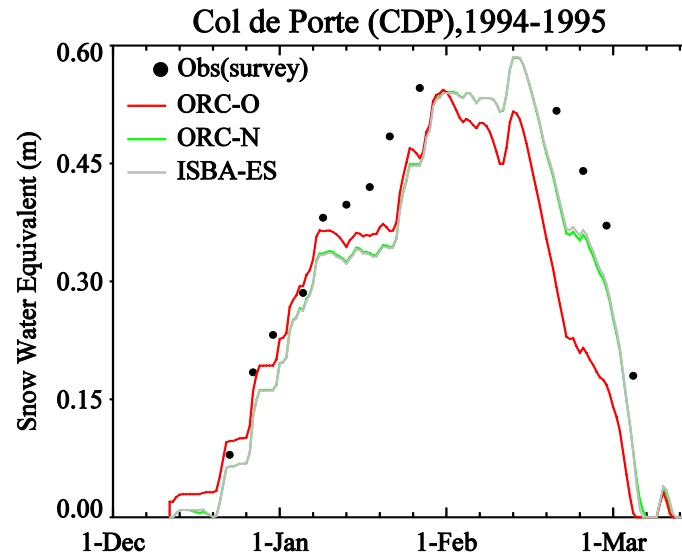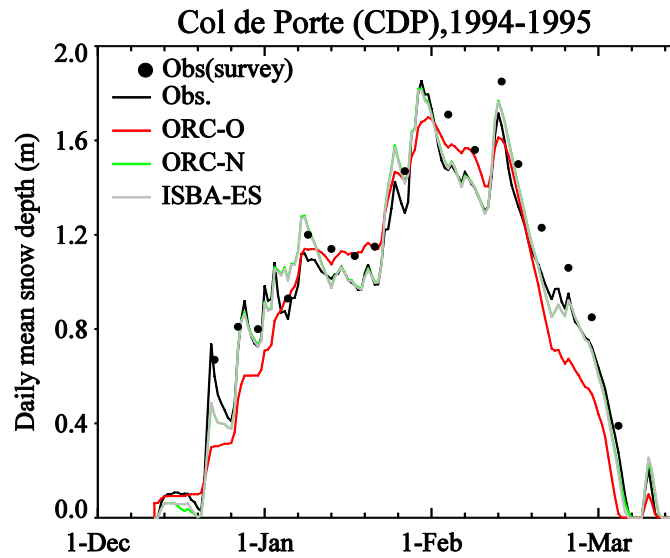
In ORC-O, snow layer temperature is equal to the first soil layer temperature

Improved Snow module in ORCHIDEE (ORC-N)

K (short wave radiation), L (longwave radiation), H (sensible heat flux), LE(latent heat flux), J (conduction heat flux), Q (snow layer heat content), Qp(advective heat from rain), Ws (snow layer SWE), Wl (snow layer liquid water content), D (snow layer depth), ρ (snow layer density) , P (precipitation)
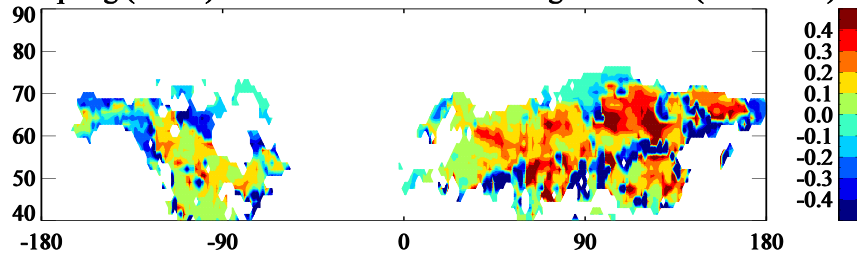
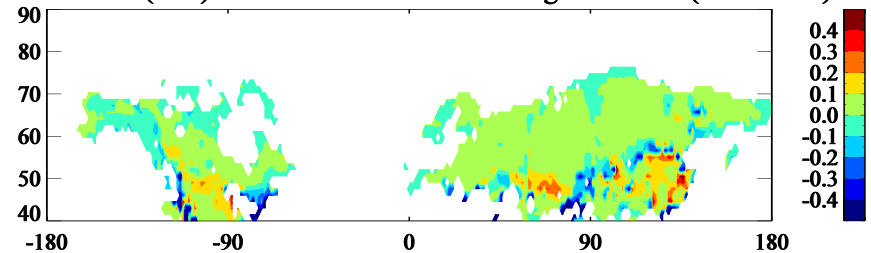# Col de Porte (France, 45.8 °N, 68 °E with an altitude of 1320 m)

ORC-O: default ORCHIDEE; ORC-N: ORCHIDEE with improved snow module; ISBA-ES: ISBA explicit snow module

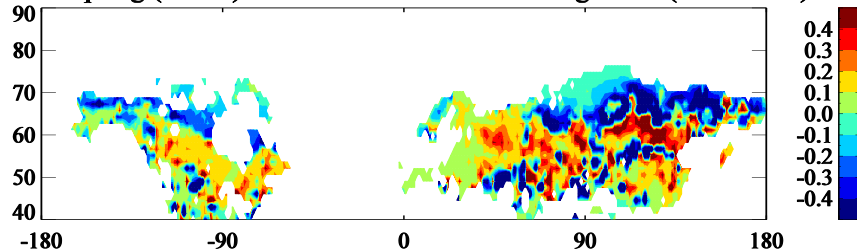# Seasonal SWE RMSE reduction between ORC-N and ORC-O (1999-2009)

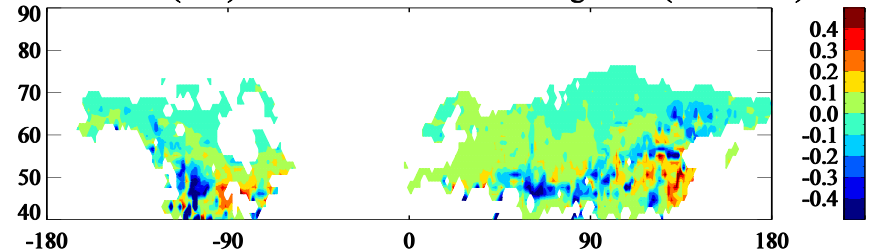Mean Spring (MAM) SWE RMSE-Reduction using Globsnow (1999-2009)

Mean Winter (DJF) SWE RMSE-Reduction using Globsnow (1999-2009)

Mean Spring (MAM) SWE RMSE-Reduction using CMC (1999-2009)

Mean Winter (DJF) SWE RMSE-Reduction using CMC (1999-2009)

The RMSE reduction is calculated by dividing two RMSE values difference (ORC-O_RMSE – ORC-N_RMSE) by their mean RMSE values.