Coupling SURFEX_V7.2 to ALARO-1 baseline version (CY38T1OP3)

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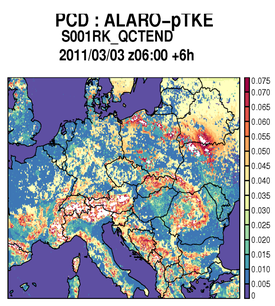
From SURFEXv5 ---> SURFEXv7.2

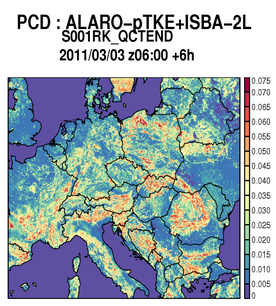
With respect to SURFEX_v5 used in CY36T1 a new binary files should be linked together with the classical ecoclimap ones to create the PGD file:
ln -s $ECOCLIMAP/ecoclimapI_covers_param.bin ecoclimapI_covers_param.bin
ln -s $ECOCLIMAP/ecoclimapII_af_covers_param.bin ecoclimapII_af_covers_param.bin
ln -s $ECOCLIMAP/ecoclimapII_eu_covers_param.bin ecoclimapII_eu_covers_param.bin

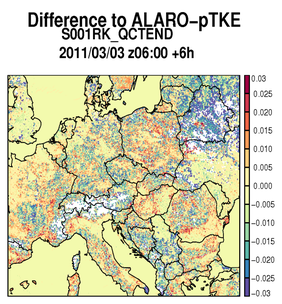
With respect to SURFEX_V5, some files should be put in the working directory as well:
1. The PGD file should be called PGD.lfi
2. The initial SURFEX file should be called TEST.lfi
3. ecoclimapI_covers_param.bin
4. ecoclimapII_af_covers_param.bin
5. ecoclimapII_eu_covers_param.bin

For the execution namelist of SURFEX we should have LCOEF=True:
&NAM_DIAG_SURFn LCOEF=.TRUE.,

ALARO-pTKE VS ALARO-pTKE+SURFEX (ISBA 2L)

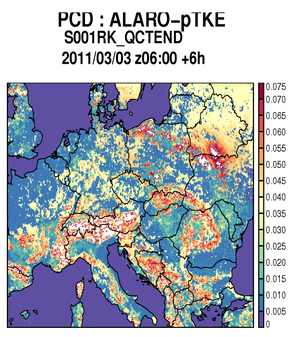


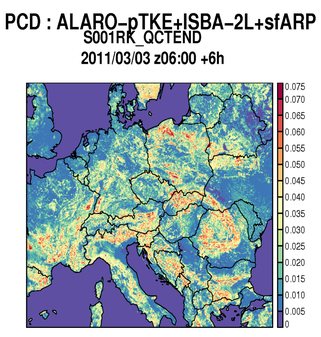


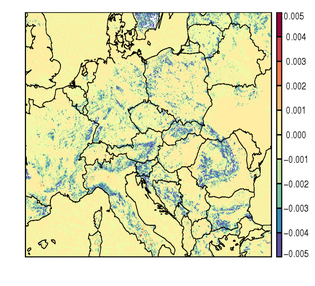


We can see that the drag coefficient over **orographic** and **snow** covered areas is different, with and without SURFEX, were SURFEX seems to underestimate its values.

These test are done using
&NAM_SSOn
CROUGH="Z01D",
XFRACZ0=15.,
/



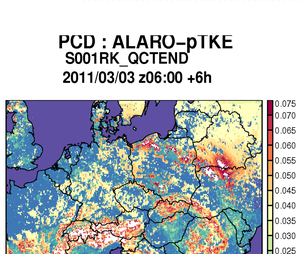


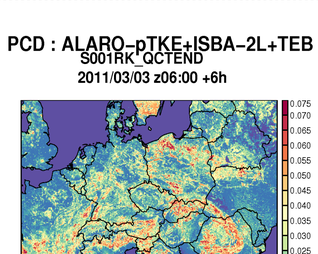


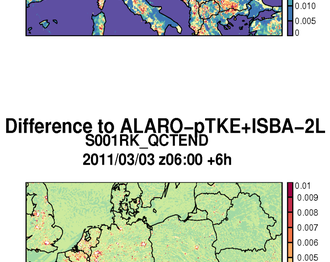
Using the stability function in SURFEX to compute the PCD and LDRAG_COEF_ARP=.T.

With this option we will use the same coefficient in the stability function as in ARPEGE ALADIN and not the ones by default within SURFEX.

But this did not reduce the differences but rather increase the underestimation of the orographic drag coefficient.



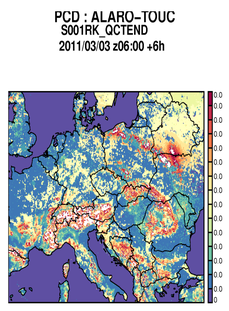


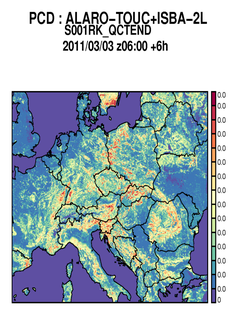


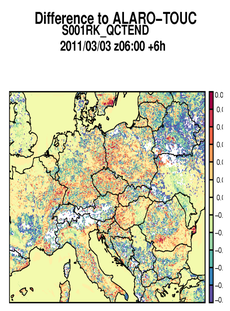
This test is done with **LDRAG_COEF_ARP=.F.** And therefore with the default value in SURFEX.

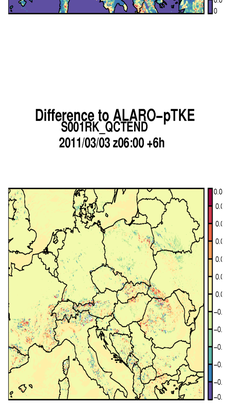
As we can clearly see now the PCD takes into account the additive drag effect of the different big cities within the LACE domain.

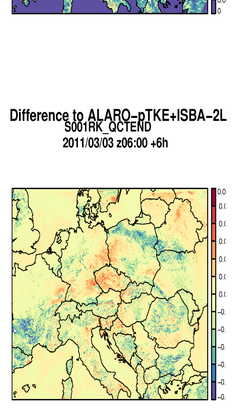
ALARO-TOUC VS ALARO-TOUC+SURFEX (ISBA 2L)

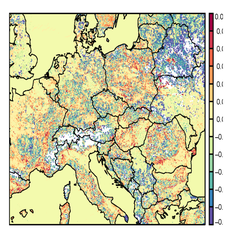






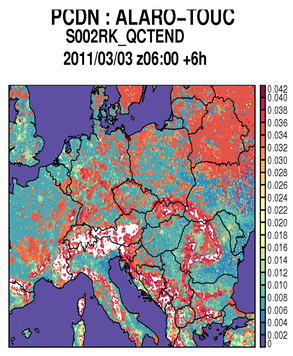


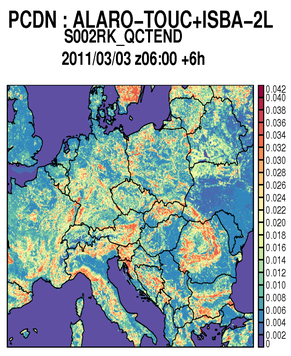


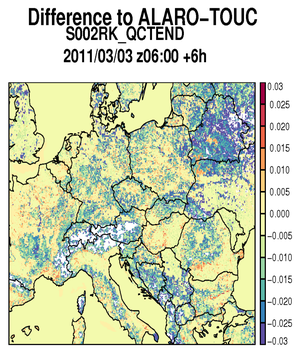


Using the stability function of TOUCANS in SURFEX to compute the PCD

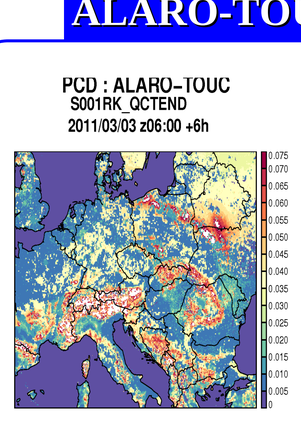
&NAM_SURF_ATM
LDRAG_COEF_ARP=.TRUE.,
LXCOEFKTKE=.TRUE.,
LXCOEFK_F1=.TRUE.,
CXGTURS='MD2',

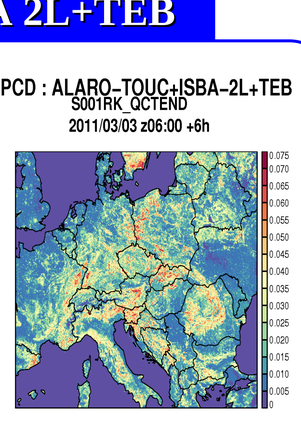


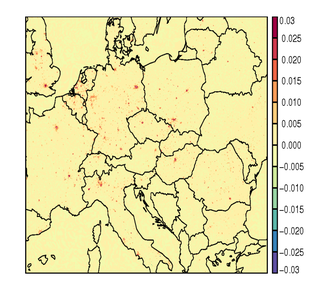




ALARO-TOUC VS ALARO-TOUC+ISBA 2L+TEB

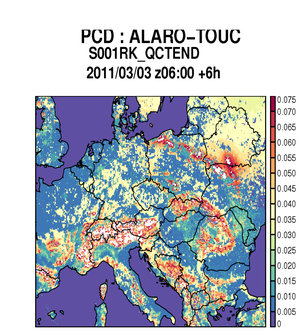


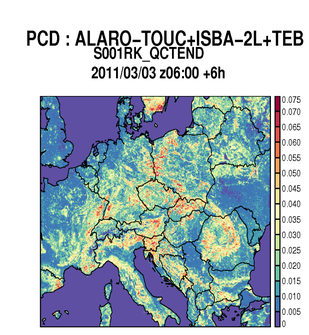


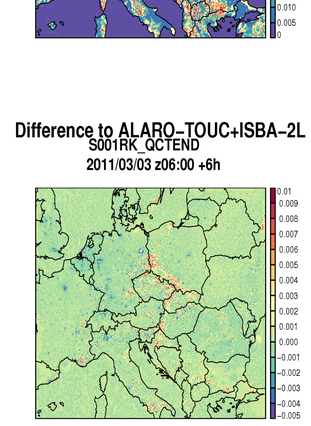


This test is done with **LDRAG_COEF_ARP=.T.** And therefore with the TOUCANS stability functions used for ISBA and TEB within SURFEX.

ALARO-TOUC VS ALARO-TOUC+ISBA 2L+TEB



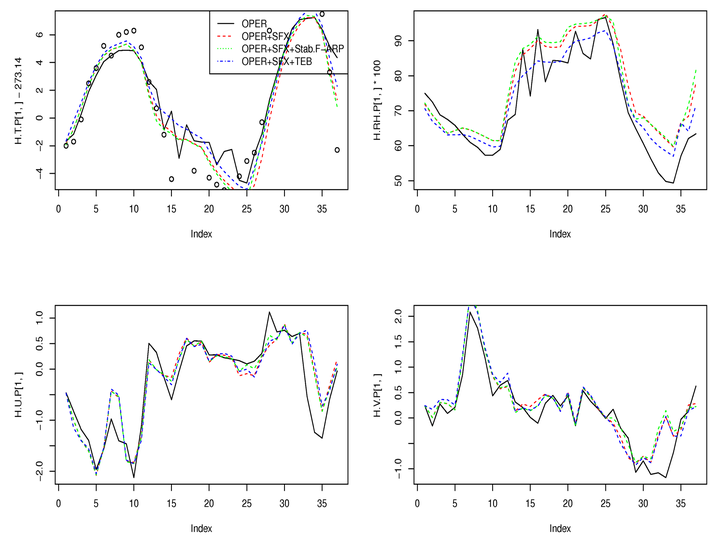




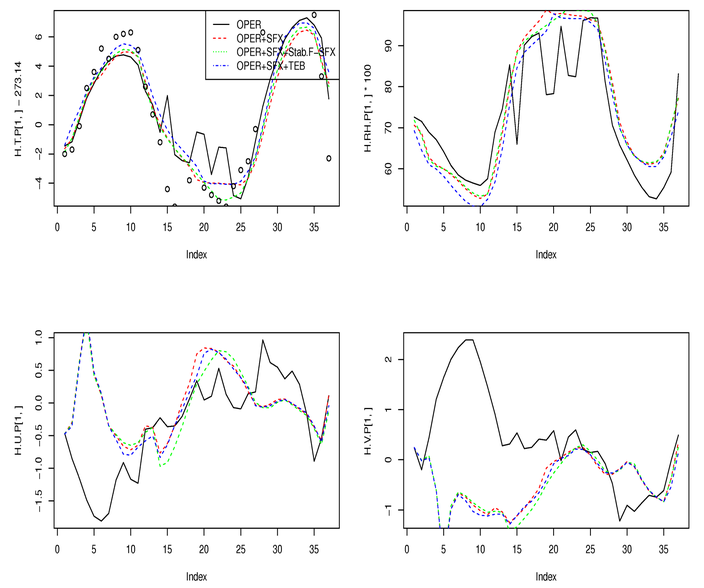
This last test is done putting all the logical keys related to ARPEGE/ALADIN computation TRUE in namelist:

&NAM_SURF_ATM
LALDTHRES=.TRUE.,
XCISMIN=0.5500E-03,
XVMODMIN=0.,
LALDZ0H=.TRUE.,
LVZIUSTAR0_ARP=.TRUE.
LRRGUST_ARP=.TRUE.,
LCPL_ARP=.TRUE.
LDRAG_COEF_ARP=.TRUE.,

Time Series ALARO-pTKE Station Kromeriz 03.03.2011



Time Series ALARO-TOUCANS Station Kromeriz 03.03.2011



References

Ivan Bašták Ďurán, Jean-François Geleyn, and Filip Váňa, 2014: A Compact Model for the Stability Dependency of TKE Production–Destruction–Conversion Terms Valid for the Whole Range of Richardson Numbers. J. Atmos. Sci., 71, 3004–3026. doi: http://dx.doi.org/10.1175/JAS-D-13-0203.1

Hamdi, R., Degrauwe, D., Duerinckx, A., Cedilnik, J., Costa, V., Dalkilic, T., Essaouini, K., Jerczynki, M., Kocaman, F., Kullmann, L., Mahfouf, J.-F., Meier, F., Sassi, M., Schneider, S., Váňa, F., and Termonia, P.: Evaluating the performance of SURFEXv5 as a new land surface scheme for the ALADINcy36 and ALARO-0 models, Geosci. Model Dev., 7, 23-39, 2014.