

The ECMWF land surface scheme and its initialisation in S2S reforecast applications

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Land initial conditions to initialise the ECMWF reforecasts used in Subseasonal-to-seasonal (S2S) operational since 2018 are based on the land surface scheme CHTESSEL (Carbon and Hydrology Tiled ECMWF scheme for surface exchanges over Land) forced with the meteorology provided by atmospheric reanalyses for generating the land surface initial conditions for the ECMWF S2S reforecast system as operational in 2018.

Compared to the version used in the ECMWF Interim Reanalysis (ERA-Interim), several changes have been implemented in

the current operational land surface scheme including: a new snow scheme and a revised soil hydrology; a representation of vegetation seasonality; improvement in surface coupling representation including water bodies, soil evaporation, and biogenic carbon fluxes.

The use of consistent land initial conditions is shown to produce improvement in predicted surface temperature anomalies. The parsimonious computational cost of the offline surface model allow to test land surface model upgrades more readily and in a flexible way.

In near future horizontal and vertical resolutions upgrades within CHTESSEL, that are promising for improving the surface and near surface parameters can make use ERA5 meteorological forcing to update the past land surface initial conditions of the reforecast systems.