

Sensitivity experiments with locally modified land surface

C. Brankovic and F. Molteni

Meteorological and Hydrological Service, Zagreb, Croatia

cedob@ictp.trieste.it

In order to study the impact of locally modified boundary conditions on seasonal time-scale predictability, a series of experiments with a recent version of ECMWF GCM was carried out. The experiments were run in ensemble mode at a relative high resolution, TL159-L40. The model was forced with observed SSTs, and initial conditions were taken from ERA-15. The broadleaf and mixed forests over the northern part of South America were replaced by tall grass. In one set of experiments, albedo was set to the appropriate value for tall grass (normal albedo), and in the other was forced to a higher value (extreme albedo).

The model response in forcing experiments was compared against control ensemble. The largest response is found in surface and near surface fields over South America. The amplitude of surface warming and the reduction in surface pressure are stronger in case with extreme albedo than with the normal one. These changes are also seasonally dependent - they are larger in JAS than in the JFM. The reduction in local precipitation rate is consistent with increased temperatures and reduced evaporation due to reduced soil moisture.

For the global precipitation, the model response is confined mostly to the tropics and to relatively smaller spatial scales. Despite such a patchy precipitation pattern, the response is stronger away from the centre of imposed forcing, in the eastern equatorial Pacific and in the Indian Ocean, than in the central and western equatorial Pacific. In the northern winter upper-air fields, a coherent wavetrain across the northern hemisphere emerges. The patterns of model response are examined in the perspective of model systematic error.

Wednesday II (Talk)