Poster Presentation
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Testing Dissolved Organic Carbon representation in the JULES-DOCM and ORCHIDEE-SOM

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Current global models of the carbon cycle consider only vertical gas exchanges between terrestrial or oceanic reservoirs and the atmosphere, hence not considering lateral transport of carbon from the continent to the oceans. This also means that such models implicitly consider that all the CO2 which is not respired to the atmosphere is stored on land, hence overestimating the land sink of carbon. Moving toward a boundless carbon cycle that is integrating the whole land to ocean continuum and its interactions with the atmosphere is needed in order to better understand Earth's carbon cycle and to make more reliable projection of its future.
Here we are presenting two newly developed land surface models which are capable of representing the production and cycling of dissolved organic carbon (DOC) within soils and the export of DOC from soils to inland waters, JULES-DOCM and ORCHIDE-SOM, and evaluate their performance. Both models represent updated versions of land surface schemes that are routinely used in Earth System simulations. They simulate vegetation growth and litter inputs to the soils as well as soil hydrology and soil temperature that control production, cycling, decomposition and finally leaching of DOC within the soils, thus allowing an integrated, physical based, spatially distributed model approach.
Both models were tested against specific sites (Brasschaat, Hainich and Carlow), for which observations of DOC concentration and leaching are available. Simulation were performed over the same period and by means of the same climate forcing data. Results of both models were compared with each other and with observations. Simulations with JULES-DOCM reproduced observed DOC concentration profiles better than ORCHIDE-SOM, which shows a strong tendency to overestimate DOC concentrations, in particular in the topsoil. Generally, DOC leaching rates simulated by ORCHIDEE-SOM are higher, consistent with higher simulated DOC concentrations. Differences in simulation results between both models are discussed in the light of the different representation of DOC production, decomposition and export.

Poster Session (see poster session schedule)