Improving estimates of riverine fresh water into the Mediterranean sea

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Estimating the freshwater input from the continents into the Mediterranean sea is a difficult endeavor due to the uncertainties from un-gauged rivers, human activities, and measurement of water flow at river outlet. One approach to estimate the freshwater inflow into the Mediterranean sea is based on the observed flux (about 63% available) and a simple annual water balance for rivers without observations (ignoring human usage and other processes). This method is the basis of most water balance studies of the Mediterranean sea and oceanic modelling activities, but it only provides annual mean values with a very strong assumption. Another approach is done by forcing a state of the art land surface model (LSM) with bias corrected atmospheric conditions. This method can estimate total fresh water flowing into the Mediterranean at daily scale but with all the caveats associated to models.

We use data assimilation techniques by merging data between the model output (ORCHIDEE LSM developed at Institut Pierre Simon Laplace) and the observed river discharge from Global Runoff Data Center (GRDC) to correct the modelled fluxes with observations over the entire basin. Over each sub watershed, the GRDC data (if available) are applied to correct model simulated river discharge. This will allow to compensate for systematic errors of model or missing processes and provide estimates of the riverine input into the sea at high temporal and spatial resolution. We will analyze the freshwater inflow into the Mediterranean obtained here with different approaches reported in previous paper. The new estimates will serve for ocean modelling and water balance studies of the region.