



## **Surface heat and freshwater fluxes and river discharge, estimated in the framework of ocean syntheses.**

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The German partner of the Estimating the Circulation and Climate of the Ocean consortium (GECCO) provides a dynamically consistent estimate of the changing ocean circulations by combining ocean observations with an ocean circulation model over a 50 year period paralleling the NCEP/NCAR reanalysis. Observations used to constrain the model encompass most available in-situ and satellite data, including altimetric measurements from TOPEX/POSEIDON, a geoid model based on GRACE measurements, and in-situ hydrographic temperature and salinity profiles and surface drifter velocities. The model is initially driven by NCEP re-analysis daily fields of the surface fresh water and heat fluxes, and twice a day wind stress data. However, those fields are changed during the assimilation procedure to bring the model in agreement with the observations. River discharge is included as a time-mean off-set of the NCEP net fresh water flux near large rivers. Changes in the surface fluxes are presented and compared against independent information available about errors in the NCEP surface flux fields. In addition, the last 10 years of the freshwater fluxes provided by the GECCO off large rivers are investigated to study the ability of ocean syntheses to imply river discharge volumes and their seasonal cycle from ocean data and ocean dynamics. The estimated seasonal cycle in run-off are tested against independent data from the GRDC (Global Runoff Data Centre). The comparison reveals plausible estimates of a seasonally varying run-off for the Amazon river, in North America for Mississippi river, for the Ganges and for the Chang-Jiang rivers.