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Forecasting the weather
- ensemble techniques
in probabilistic weather prediction

Oceanic circulation sensitvity to river discharge prescription: an application to the Mediterranean basin

G. Sannino (1), G. Pisacane (1), M.V. Struglia (1), and B.M. Fekete (2)

(1) ENEA C.R. Casaccia Via Anguillarese, 301 Roma Italy (giovanna.pisacane@enea.it/++390630484264), (2) CUNY Environmental CrossRoads Initiative at The City College of New York

In the framework of global climate studies, there is an increasingly growing concern about the hydrological balance of the Mediterranean region, where high population density and intense exploitation activities pose severe questions on the sustainability of terrestrial water management both for the present and the future. Moreover, the hydrological balance of the Mediterranean basin is expected to have global relevance, as the interaction with the Atlantic Ocean is non negligible for the correct representation of the Atlantic circulation and its variability, while global greenhouse warming would undoubtedly affect regional climate, possibly triggering global feedback processes.
The need for a substantial advance in both monitoring and modeling techniques has fostered the birth of the international programs HyMeX (Hydrological cycle in Mediterranean EXperiment) and MedCLIVAR (Mediterranean CLImate VARiability and Predictability), whose main objective is to better characterize the regional water cycle in the Mediterranean area. Such efforts are also sustained by the consideration that the Mediterranean region naturally presents itself as a test basin, as it hosts a variety of complex processes of scientific interest which are here characterized by relatively short time scales, thus allowing both experimental monitoring and affordable numerical simulations.
Although progress is being made in coupling atmospheric and ocean regional models, there is still a need for a reliable explicit treatment of the river discharge term, which links the oceanic hydrological cycle to terrestrial water balance through the prescription of freshwater flux forcing at the river mouths.
We test the sensitivity of the MIT Ocean Model to high temporal resolution prescription of discharge at the river outlets in the Mediterranean basin, with the aim of designing optimal freshwater forcing when the river routing is incorporated in the regional coupled system PROTHEUS.
River discharge is computed offline by routing runoff fields modeled by the atmospheric regional model RegCM3 via the river routing scheme from WBMplus. Results are compared to those obtained by prescribing monthly discharges estimated via the integration of runoff over the Mediterranean river catchments.