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Assessment of the Impact of Dams on River Regimes, Sediment Transports to the Sea, and Coastal Changes

Gil Mahe, Oula Amrouni, Thouraya Ben Moussa, Laurent Dezileau, Rajae El Aoula, Hamadi Habaieb, Abderraouf Hzami, Ilias Kacimi, Abderrahmane Khedimallah, Fatma Kotti, Mohamed Meddi, Nadia Mhammdi, and Saadi Abdeljaouad

Keywords

Rivers • North Africa • Dams • Sediment transport • Coastal morphological changes
Sands

A great number of rivers of North Africa are equipped with many dams for multiple purposes, mainly potable water, irrigation and energy production. In most of the countries—Morocco, Algeria and Tunisia, the storage capacity exceeds the runoff capacity, which means that water is stored several times in a row during its course to the sea. This leads to the storage of massive amounts of sediments into the dams' lakes, but nothing is known about how much sediment is released from these dams. This topic is mainly unstudied by the regional scientists due to lack of measurements of sediment transport, or poor access to observed data when available. Thus there are no time series of sediment loads to the sea from the North African rivers. One of the conse-

quences is that it is impossible to relate recently observed coastal morphological changes to changes in the sediment recharge from the continent. This study brings a synthesis of recent works on this topic over the largest rivers of North Africa in the three countries. In Morocco and Tunisia there no continuous time series of sediment transport observations. There we sampled sediment cores in river meanders, to draw the history of real sediment exportations to the sea, on the basis of granulometry, geochemical and isotopic studies. Only in Algeria are there observations of sediment transport at main hydrological stations. The times series show many lack of data which are reconstructed according to runoff/concentrations correlations, taking seasonal factor

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into account. Methodologies and first results are shown in this study. They reflect the huge decrease of the sediment transport to the sea over time since several decades, and in the case of the Medjerda river in Tunisia, the absence of sands in the river sediments since 34 years and the construction of the major dam on the main stream.

Author Biography



Dr. Gil Mahe Research Director at the Institut de Recherche pour le Développement (IRD). He is an hydroclimatologist specialized on West and Central Africa and Maghreb, Ph.D. of the Faculty of Sciences of Paris XI, on the topic of African discharges to the ocean and links with climate and ocean variability, and HDR of the Montpellier University on the topic of Relationships between man, environment and water resources in Africa and climate change. He received the “Georges Hachette Award” from the Société de Géographie

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