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The intense 2007-2009 drought in the Fertile Crescent: Impacts and associated atmospheric circulation

Ricardo M. Trigo (2,3), Celia Gouveia (1,2), and David Barriopedro (2)

(1) Escola Superior de Tecnologia, Instituto Politécnico de Setúbal, DEM, Setúbal, Portugal (cgouveia@est.ips.pt), (2) Instituto Dom Luiz, Faculdade de Ciências, Universidade de Lisboa, Portugal., (3) Departamento de Engenharias, Universidade Lusófona, Lisbon, Portug

The historical region of Fertile Crescent area (FC hereafter) was hit by an intense and prolonged drought episode in both 2008 and 2009 as a consequence of the very low values of precipitation registered during the two hydrological years comprised between 2007 and 2009. This drought event had major socio-economic impacts in several countries located within the affected area; Iraq, Jordan, Syria and Iran. The economic impact was mostly due to the steep decline in agricultural productivity in the highly populated areas of the Euphrates and Tigris river basins. Traditional methods of drought assessment and monitoring depend heavily on the availability of rainfall data as recorded in meteorological and hydrological networks. The recent availability of reliable satellite imagery covering wide regions over long periods of time has progressively strengthen the role of remote sensing in environmental studies, in particular in those related to drought episodes. In particular, large-scale impacts in vegetation dynamics as well as in lake level can be now achieved with in near real-time with different satellite platforms.
The aim of this work is to characterize the temporal and spatial extent of this extreme drought event for the two consecutive hydrological drought years of 2007-2008 and 2008-2009 at the monthly and seasonal scales and to evaluate some of hydrological and vegetative impacts of this event using appropriate satellite information. We confirm that this is the most intense 2-year drought event since 1940 (although just marginally below the 1998-2000 event). Furthermore, the Lake Tharthar (Iraq) is currently reaching its lowest values, similar to those achieved at the end of the prolonged drought between 1998 and 2001. The exceptionality of the 2000 and 2008 events were outstanding, not only because the large amount of pixels with more than 5 months in vegetation stress, but also due to the fact that the persistent drought affect a large amount of pixels belonging to cultivated areas, that are responsible for wheat and barley productions in FC. The impact of drought is clearly visible during the 2000 and 2008 in both wheat and barley productions, with significant economic losses in the affected countries.