Geophysical Research Abstracts
Vol. 21, EGU2019-16137, 2019
EGU General Assembly 2019

SIM: smart irrigation from soil moisture forecast using satellite and hydro –meteorological modelling

Chiara Corbari (1), alessandro ceppi (1), giovanni ravazzani (1), gabriele lombardi (1), drazen Skokovic (2), jose sobrino (2), arnau amengual (3), romu romero (3), raffaele salerno (4), giacomo branca (5), and marco mancini (1)

(1) Politecnico di Milano, DICA, Milano, Italy (chiara.corbari@polimi.it), (2) Physic department, university of valencia, valencia, spain, (3) Physic department, university of balearic islands, palma, spain, (4) CEM, centro epson meteo, milan, italy, (5) department of economics, tuscia university, viterbo, italy

The conflicting use of water is becoming more and more evident, also in regions that are traditionally rich in water. With the world's population projected to increase to 8.5 billion by 2030, the simultaneous growth in income will imply a substantial increase in demand for both water and food (expected to increase by 70% by 2050). Climate change impacts will further stress the water availability enhancing also its conflictual use. The agricultural sector, the biggest and least efficient water user, accounts for around 24% of total water use in Europe, peaking at 80% in the southern regions, is likely to face important challenges in order to sustain food production and parsimonious use of water.
The paper shows the development of a system for operative irrigation water management able to monitor and forecast the crop water need reducing the irrigation losses and increasing the water use efficiency. The system couples together satellite and ground data, with pixel wise hydrological soil water balance model using recent scientifically outcomes on soil moisture retrieval from satellite data and hydrological modelling. Discussion on the methodological approach based on the satellite land surface temperature LST, ground evapotranspiration measures, and pixel wise hydrological modelling is provided proving the reliability of the forecasting system and its benefits.
The activity is part of the European Chinese collaborative project (SIM, Smart Irrigation Modelling, www.sim.polimi.it) which has as main objective the parsimonious use of agricultural water through an operational web tool to reduce the use of water, fertilizer and energy keeping a constant crop yield. The system provides in real-time the present and forecasted irrigation water requirements at high spatial and temporal resolutions with forecast horizons from few up to thirty days, according to different agronomic practices supporting different level of water users from irrigation consortia to single farmers.
The system is applied in different experimental sites which are located in Italy, the Netherlands, China and Spain, which are characterized by different climatic conditions, water availability, crop types and irrigation schemes. This also thanks to the collaboration of several stakeholders as the Italian ANBI, Capitanata and Chiese irrigation consortia and Dutch Aa and Maas water authority
The results are shown for two case studies in Italy and in China The Italian ones is the Sud Fortore District of the Capitanata Irrigation consortium which covers an area of about 50'000 hectares with flat topography, hot summer and warm winter, mainly irrigated with pressurized aqueduct. The district is an intensive cultivation area, mainly devoted to wheat, tomatoes and fresh vegetables cultivation; the Chiese irrigation district with higher water availabilily on fixed turn irrigation.