Towards a Drought Monitoring System in Catalonia

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Motivation and Objectives

Drought is a natural hazard with impacts on agriculture, hydrological resources, forest, and other economic activities. Climate Change: Precipitation variability and temperature values are projected to increase almost everywhere.

Mediterranean: In the Med. Basin, precipitation variability and total amounts are projected to increase(decrease) respectively.

Catalonia: Water demand/resources is projected to increase(decrease) in the future, leading to SEVERE future hydrological stresses.

Annual precipitation and temperature change (% and ºC respect) using the CMIP5 models GFDL, CanESM2 and MPI-ESM under the RCP8.5 scenario. Changes are presented aggregated 2011-40, 41-70 and 71-2100 respect to 1971-2000 control period.

OBJECTIVE

Construction of a high resolution Drought Observatory in Catalonia, with daily available information provided by a set of indexes useful for monitoring drought impacts on meteorology, agriculture, forest, hydrology, etc.

Database and initial Drought Indexes

Drought monitoring

CURRENT SITUATION (updated daily) AT EACH CATALAN MUNICIPALITY AND AT 1x1 km GRID RESOLUTION

DROUGHT INDEXES: STANDARDIZED PRECIPITATION INDEX (SPI) AND DROUGHT CODE (DC)

SPI: Using precipitation grids aggregated at 1,2,3…12, 24, 36 and 72 months. It requires a previous precipitation PDF adjustment. SPI is frequently used in METEOROLOGY, CLIMATOLOGY, AGRICULTURE and HYDROLOGY.

DC: index from the Canadian Forest Fire Index. Daily precipitation and temperature grids required. DC is frequently used in FORESTRY and WILDFIRE FOREST PREVENTION.

Drought Monitoring

WATER DEFICIT CATEGORY 1971-2017 EVOLUTION (% Catalonia extension)

Catalan Municipalities represented according to the hydrological regime registered at 2, 3, 6, 9, 12 and 24 months of observation time at 30th JUNE 2017

(1)Extension of the set of indexes with the incorporation of the Standardised Precipitation-Evaporation Index, Palmer Drought Index, and ETO (Penman-Monteith version). (2)To obtain historical overview for all drought indexes in order to assess possible attribution of future water deficits in the context of global warming.

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