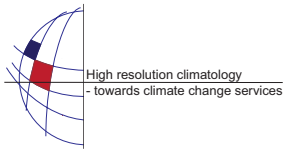
EMS Annual Meeting Abstracts
Vol. 7, EMS2010-575, 2010
10th EMS / 8th ECAC



Madeira Extreme Floods: 2009/2010 Winter. Case study - 2nd and 20th of February

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Floods are at world scale the natural disaster that affects a larger fraction of the population. It is a phenomenon that extends it's effects to the surrounding areas of the hydrographic network (basins, rivers, dams) and the coast line.
Accordingly to USA FEMA (Federal Emergency Management Agency) flood can be defined as:"A general and temporary condition of partial or complete inundation of two or more acres of normally dry land area or of two or more properties from: Overflow of inland or tidal waters; Unusual and rapid accumulation or runoff of surface waters from any source; Mudflow; Collapse or subsidence of land along the shore of a lake or similar body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels that result in a flood as defined above."
A flash flood is the result of intense and long duration of continuous precipitation and can result in dead casualties (i.e. floods in mainland Portugal in 1967, 1983 and 1997). The speed and strength of the floods either localized or over large areas, results in enormous social impacts either by the loss of human lives and or the devastating damage to the landscape and human infrastructures.
The winter of 2009/2010 in Madeira Island was characterized by several episodes of very intense precipitation (specially in December 2009 and February 2010) adding to a new record of accumulated precipitation since there are records in the island.
In February two days are especially rainy with absolute records for the month of February (daily records since 1949): 111mm and 97mm on the 2nd and 20th respectively.
The accumulated precipitation ended up with the terrible floods on the 20th of February causing the lost of dozens of human lives and hundreds of millions of Euros of losses
The large precipitation occurrences either more intense precipitation in a short period or less intense precipitation during a larger period are sometimes the precursor of geological phenomena resulting in land movement, many times in the same or very near areas from previous episodes.
Although flood episodes have a strong dependency in the topography and hydrological capacity of the terrains, the human intervention is also an enormously important factor, more specifically the anthropogenic factors such deforestation, dams, change of water fluxes, and impermeabilization of the terrain surface.
The risk assessment of floods should be address based not only on the knowledge of the meteorological and hidrometeorological factors, such the accumulated precipitation and soil water balance but also in the river path and water amounts and well the surrounding geomorphology of the water basins.
The current work is focused in the meteorological contribution for the floods occurrence episode of 2010 in the Madeira Island, specifically the climatic characterization of the 2009/2010 Winter with particular incidence on the days of the 2nd and 20th of February.