



The new record of daily precipitation in Lisbon since 1864: diagnosis and impacts of an exceptional precipitation episode

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On 18 February 2008 the city of Lisbon had its rainiest day on record, i.e. since the establishment of the D. Luís Observatory in 1853 (continuous observations of meteorological variables are only available since 1864). Fortunately a Portuguese funded project (SIGN) allowed to digitize all the data between 1864 and 1941, allowing a proper comparison with previous extreme events and also to compute more significant return periods. We can now state that a new absolute maximum of daily precipitation at this station occurred last 18 February, when 118.4 mm were registered, surpassing the previous maximum of 110.7 mm (observed on 5 December 1876). Interestingly, these record breaking characteristics were confined to the city of Lisbon, not being observed in rural and suburban neighborhoods, where the anterior maxima recorded in 26 November 1967 or 18 November 1983 were not achieved. In fact, this extreme event was relatively uncharacteristic when compared with typical extreme precipitation events in southern Portugal (Fragoso and Tildes Gomes, 2008). These extreme episodes tend to occur preferably in fall (late September until early December) and covering a wider area.

In this work we present an extensive analysis of the large-scale and synoptic atmospheric circulation environment leading to this extreme rainstorm as well as the consequences, namely floods and landslides that produced relevant socio-economic impacts (including 4 casualties). This will be achieved through the characterization of the extreme precipitation episode, describing its temporal structure and the geographic incidence of the event and also assessing statistically the exceptionality of the daily rainfall. The study of the atmospheric context of the episode will be performed with Satellite and radar data, complemented by several large-scale fields obtained from the NCAR/NCEP Reanalyses dataset, including sea level pressure, 500 hPa Geopotential height, precipitation rate, CAPE index.

FRAGOSO, M.; TILDES GOMES, P. (2008) – Classification of daily abundant rainfall patterns and associated large-scale atmospheric circulation types in Southern Portugal, *International Journal of Climatology*, 28: 4, p. 537-544.