

**NATURAL PHENOMENA**

## **Storms in the Gulf, but don't blame mankind for natural disasters**

**CREATION**

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Extensive media coverage was given to the extreme rainfall event that affected the city of Dubai, in the United Arab Emirates (UAE), resulting in extensive flooding and severe disruption to the local population and tourists. In addition, 20 deaths were reported

between the UAE and Oman in vehicles swept away by floodwaters. Regarding the extent of the event, data from the Dubai airport station indicate that a total of 163 millimetres (mm) of rain fell in less than 24 hours, of which 2mm in the evening of Monday 15 and 142mm during Tuesday 16 April, and here it's worth remembering that 1 mm corresponds to 1 litre per square metre. Furthermore, the meteorological service of the United Arab Emirates reported that in the eastern part of the country, in Al Ain, south-east of Dubai, as much as 254mm of rain was recorded.

**Regarding the level of abnormality of the event,** it must first be considered that according to the latest statistics of the World Meteorological Organisation, the average annual rainfall at Dubai airport for the period 1991-2020 was 79.2 mm, so that the value of 163 millimetres is at first sight rather abnormal and equal to twice the rainfall that falls on average in a year. It should also be remembered that large tropical storms such as the one that occurred between 15 and 16 April are not uncommon events for the Arabian Peninsula, as shown in the article, *The atmospheric controls of extreme convective events over the southern Arabian Peninsula during the spring season*, published in 2021 in the scientific journal *Atmospheric Research*, which describes about a hundred such events that occurred in the southern Arabian Peninsula from 2000 to 2020, most of which occurred between March and April. They include the storm of 8 March 2016, which caused as much as 240 millimetres of rain in Dubai.

**These are the facts in a nutshell,** which invite us to reflect on the media's interpretation of the event, which has seen various media pointing the accusing finger at anthropogenic climate change on the one hand and artificial cloud seeding on the other.

**In attributing the rainfall event in question to global warming,** various climatologists, such as Michael Mann, have committed themselves to the theory that the increased amount of water vapour in the atmosphere is behind the increased intensity of precipitation. This theory, however, which is in vogue today (various 'TV climatologists' at home reiterate it at every turn), clashes with the fact that globally, for the period from 1950 to the present day, only 8% of the thousands of weather stations analysed show a significant increase in the intensity of events, while 2% show a significant decrease and the remaining 90% are stationary. The marked prevalence of stationarity in the extreme rainfall regime may be due to the fact that the increase in water vapour in the atmosphere, which is a foregone conclusion of the global increase in temperature, is not a sufficient condition for more violent rainfall, in the sense that more frequent and/or more intense atmospheric systems must also occur that are capable of translating the increased humidity into extreme rainfall (which also means more energy, as one gram

of vapour carries 2450 joules that are released by the condensation process).

**This thesis is supported by the scientific paper *Rainfall Trends and Extremes in Saudi Arabia in Recent Decades*** published in 2020 by the journal *Atmosphere* and in which an analysis is presented conducted for the period 1978-2019 on rainfall data from 25 weather stations in Saudi Arabia, a country that occupies a large part of the Arabian Peninsula. From this analysis it emerges that out of 25 stations investigated, only 2 (8%) show a statistically significant increase in the frequency of rainfall above the threshold of 25 mm per day, considered indicative of extreme events for the area.

**Regarding the idea of attributing the extreme event in Dubai to the artificial insemination of clouds**, for rain stimulation purposes, it should be noted that the genesis of rain occurs in the presence of condensation nuclei, so that for decades in various parts of the world aeroplanes or ground-to-air rockets have been used to insert artificial condensation nuclei (silver iodide or dry ice) into the clouds with the intention of stimulating rain. The limitation of artificial cloud seeding, however, lies in the fact that rain cannot be obtained with a clear sky or with clouds of reduced thickness, so the intervention must concern sufficiently thick clouds; even in this case, however, the effects obtained are more often than not modest, so that the effectiveness of the method is still under discussion. In addition to this, in the specific case of Dubai, the meteorological forecast models had predicted the rainfall event of 15-16 April well in advance (5-6 days), which leads to the exclusion that cloud seeding activities allegedly taking place in the area where the event took place could have played a significant role in the genesis of the event.

**And on the occasion of the event of 15-16 April**, the air was naturally overloaded with condensation nuclei, the result of the dust introduced into the atmosphere by the strong winds recorded on 15 April and which had generated a dust storm. In short, the 'ciccetti' (as the illustrious meteorologist Giorgio Fea liked to call condensation nuclei) were present to such an extent in Dubai's atmosphere that the role of those introduced by artificial insemination - assuming there was any - can only have been marginal.