

A Record Rainfall and Cold Winter Followed the Pinatubo Eruption

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For the 1991-92 rainy season (which followed the Pinatubo eruption) most rainfall stations in Israel recorded record rainfall. In addition, the months of December and June of that year also showed record rainfall amounts. In addition, during that season, the longest rain spell in Israel was reported. Winter was colder than average and the number of snow and hailstorms were above normal. Comparing the dust veil index (DVI) values (without the Pinatubo data) of the nine strongest volcano eruptions (since Krakatau, 1883) with Jerusalem rain data for winters following these eruptions shows that rainfall increased after eruption events. The 95% confidence interval for Jerusalem rainfall in 1991/2 after the Pinatubo eruption was 594-990 mm. However, during that year the annual rainfall surpassed the upper 99% confidence limit and reached, as in other parts of the country, a record of 1134 mm. The connection between volcano aerosols and excess rainfall in Israel is explained by increasing sea-air temperature differences in the eastern Mediterranean; the rate of air cooling is more rapid than sea water cooling, promoting instability. A negative correlation between winter temperatures and rainfall in Israel is evidence for this hypothesis. This theory is supported by a GCM experiment which shows that after strong volcanic eruptions there is significant cooling over Greenland and North Africa – Middle East. These conditions cause mild dry winters over West Europe, with low temperatures and high rainfall over the Eastern Mediterranean Sea region. The synoptic situation displays a blocking high over Western Europe and an upper air trough over Eastern Europe.