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Critical review of a new volcanic eruption chronology

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Sigl. et al. (2015, Nature) present historical evidence for 32 volcanic eruptions to evaluate their new polar ice core 10-Be chronology – 24 are dated within three years of sulfur layers in polar ice. Most of them can be interpreted as weather phenomena (Babylonia: disk of sun like moon, reported for only one day, e.g. extinction due to clouds), Chinese sunspot reports (pellet, black vapor, etc.), solar eclipses, normal ice-halos and coronae (ring, bow, etc.), one aurora (redness), red suns due to mist drops in wet fog or fire-smoke, etc. Volcanic dust may facilitate detections of sunspots and formation of Bishop's ring, but tend to inhibit ice-halos, which are otherwise often reported in chronicles. We are left with three reports possibly indicating volcanic eruptions, namely fulfilling genuine criteria for atmospheric disturbances due to volcanic dust, e.g. bluish or faint sun, orange sky, or fainting of stars for months (BCE 208, 44-42, and 32).

Among the volcanic eruptions used to fix the chronology (CE 536, 626, 939, 1257), the reports cited for the 930s deal only with 1-2 days, at least one reports an eclipse. In the new chronology, there is a sulfur detection eight years after the Vesuvius eruption, but none in CE 79. It may appear surprising that, from BCE 500 to 1, all five northern sulfur peaks labeled in figure 2 in Sigl et al. are systematically later by 2-4 years than the (corresponding?) southern peaks, while all five southern peaks from CE 100 to 600 labeled in figure 2 are systematically later by 1-4 years than the (corresponding?) northern peaks.

Furthermore, in most of their six strongest volcanic eruptions, temperatures decreased years before their sulfur dating – correlated with weak solar activity as seen in radiocarbon, so that volcanic climate forcing appears dubious here. Also, their 10-Be peaks at CE 775 and 994 are neither significant nor certain in dating.