



Tree-ring density variations during the 1450s period of strong volcanic forcing

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Ice core based reconstructions of the magnitude and timing of volcanic eruptions are used to force climate models and therefore are of critical importance for assessing the dynamics of the global climate system. The forcing timeseries of the past millennium are punctuated by a few very large volcanic events including a major eruption in the 1450s. This event was originally attributed to the Kuwae caldera in the South Pacific dated to the year 1452. Recent evidence from high-resolution ice core records, however, indicated a shift by six years (to 1458), a change that will fundamentally alter 15th century climate simulations and affect model/proxy comparisons. Here we compile a Northern Hemisphere network of 25 tree-ring maximum latewood density chronologies extending back over the past 650+ years and analyze the 1450s temperature deviations. Warm season temperature reconstructions from these data reveal the spatially most coherent and by far most severe cooling of the 15th century occurred in 1453. Cooling was overall stronger in the Eurasian high latitudes and northwestern North America, and less severe in central and southern Europe. These findings indicate that the original dating of a large eruption in 1452 was correct.