



Influence of wind patterns on the dispersal of volcanic plumes in the Azores region: test study of the 1630 eruption of Furnas Volcano (S. Miguel, Azores)

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Explosive volcanic eruptions inject great amounts of tephra into the atmosphere. The dispersal of volcanic plumes results from the interaction between the atmospheric conditions and the characteristics of the plume it self. Characterisation of the wind fields in the Azores region provides critical input parameters for existing tephra fall-out dispersal models, essential for hazard and risk assessment. Wind data from the Lajes/Santa Rita station, between 1947 and 2003, available on the Integrated Global Radiosonde Archive (IGRA), was compiled at mandatory levels from 850 mb up to 20 mb. The statistical analyses of the wind dataset, using correlation matrixes, showed two seasonal groups that can be defined as summer and winter months. Vertical wind profiles revealed a stratified atmosphere with generally similar directions and increasing speed until the tropopause but significantly different directions and lower speeds on the stratosphere. In the troposphere the most frequent directions are west-northwest and north-northwest during the summer and west-southwest during the winter. Above 70 mb a strong eastern direction prevails during the summer and a western direction during the winter. Synthetic wind dispersal in the Azores region was produced in order to consider the wind patterns on tephra fall-out studies. Eruptive parameters from the 1630 historical eruption of Furnas Volcano (S. Miguel, Azores) were applied to model the fall-out dispersal under the most frequent wind conditions.