"Acid neutralization and sulphur retention in s-impacted andosols"

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Abstract
While Andosols have a proven capacity to buffer acid inputs, their long-term chemical response to elevated acid deposition remains poorly known. In this respect, the high anion retention capacity of Andosols constitutes a key parameter. Yet, the mechanisms involved in anion retention, especially sulphate, are still a matter of scientific debate. In this study, we report on the impacts of volcanogenic S and acid depositions on (i) the sulphate distribution and (ii) the processes involved in the neutralisation of the acid inputs, in two distinct soil series located downwind from Masaya volcano (Nicaragua), one of the world's largest natural source of SO2. The first series corresponds to weathered Eutric Andosols rich in allophanic constituents and the second series to weakly developed Vitric Andosols rich in volcanic glass. Long-term acid gas emission by Masaya volcano has led to important changes in the chemistry of the Andosols downwind. Sustained acid inputs have decreased the pH an...

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Acid Neutralization and Sulphur retention in S-impacted Andosols

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References


Carn, S.A. & Bluth, G.J.S. 2003. Prodigious sulfur dioxide emissions from Nyan- 
ether (EGME) for determining specific surface of silicate materials. Soil Sci-
ence, 100, 356-360.
Chao, T.T. 1964. Anionic effects on sulfate adsorption by soils. Soil Science Society of 
America Proceedings, 28, 581-583.
Chao, T.T., Harward, M.E. & Fang, S.C. 1962. Adsorption and desorption phe-
nomena of sulfate ions in soils. Soil Science Society of America Proceedings, 
26, 234-237.
Chao, T.T., Harward, M.E. & Fang, S.C. 1965. Exchange reactions between hy-
chemical Exploration, 44, 65-106.
Courchesne, F. & Hendershot, W.H. 1990. The role of basic aluminum sulfate min-
erals in controlling sulfate retention in the mineral horizons of two Spodosols. 
Soil Science, 150, 571-578.
Couto, W., Lathwell, D.J. & Bouldin, D.R. 1979. Sulfate sorption by two Oxisols 
Environmental hazards of fluoride in volcanic ash: a case study from Ruapehu 
volcano, New Zealand. Journal of Volcanology and Geothermal Research, 121, 
271-291.
Soil Science Society of America, Madison, WI.
of a Spodosol Bs horizon from acidic deposition. Environmental Science and 
Technology, 24, 531-537.
Delmelle, P. 2003. Environmental impacts of tropospheric volcanic gas plumes. In : 
Volcanic degassing (eds C. Oppenheimer, D.M. Pyle & J. Barclay), pp. 381-
canic waters discharged into the Banyupahit stream, Ijen caldera, Indonesia. 
Journal of Volcanology and geothermal research, 97, 55-75.
Delmelle, P., Baxter, P.J., Beaulieu, A., Burton, M., Francis, P.W., Garcia-Alvarez, 
J., Horrocks, L., Navarro, M., Oppenheimer, C., Rothery, D., Rymer, H., St-
Masaya volcano’s continued unrest probed in Nicaragua. Eos, Transactions, 
American Geophysical Union, 80, 575-581.
Delmelle, P., Stix, J., Bourque, C. P.A., Baxter, P. J., Garcia-Alvarez, J. & Bar-
quero, J. 2001. Dry deposition and heavy acid loading in the vicinity of Masaya


List of Publications

A. International Peer-Reviewed Journals


Delfosse, T., Delmelle, P. & Delvaux, B. Sulphate sorption at high equilibrium concentration in Andosols. Submitted to *Geoderma*.

B. Conference Proceedings


