Volcano Monitoring with Citizen Scientists

by

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Professor Rymer began her lecture by emphasising the advantages of using citizen scientists in volcano monitoring fieldwork. She then focused her lecture on the specific example of the Masaya volcano in Nicaragua explaining that living next to a volcano has both advantages and disadvantages. On the one hand, volcanic soils tend to be highly fertile, on the other there is the risk of possibly deadly lava flows and ash falls.

Attempting to predict the timing of eruptions is the focus of much scientific work and monitoring, and it is acknowledged to be extremely difficult. Even harder, is predicting when an eruption will be over and people can return safely to their homes. One of the ways in which scientists may gain a handle of this is by careful monitoring of the volcano over many years, measuring changes in its overall volume, the subterranean movement of lava and the amount of gas released, given that gas flows decrease if no new magma is being fed to the magma chamber. For example, the Masaya volcano, in common with many others, has not produced lava flows since 1772. However, it is still releasing substantial amount of gasses such as carbon dioxide and sulphur dioxide and molten lava is visible in one of the craters.

Volcanic sulphur dioxide has both local and global effects, but Professor Rymer's research programme focuses on local issues. Each year she takes an expedition of citizen scientists who spend two weeks tramping the slopes of the volcano making hundreds of measurements of local gravity and height (to millimetre accuracy) plus observations of rates of deposition of sulphur on local vegetation.

Satellite monitoring is also of increasing importance in Earth sciences, but for some tasks you still need boots on the ground and working with a citizen science group (recruited through the Earth Watch organisation) means that Professor Rymer can have lots of boots doing field work. The result of this is that large numbers of observations, accumulated over decades, are creating a picture of the way magma moves underneath the volcano and how this relates to gas release. There is also a pay-off for local farmers, in that it is possible to give guidance as to what types of crop are likely to be successful in future years. For example, sulphur deposition kills coffee crops, but pineapples appear to like it. One useful result from recent years is that local people can estimate the rate of sulphur deposition sufficiently accurately simply by observing the density of wild Tillandria plants, which exhibit a well characterised dose-response curve.

The CSTS programme year ended with an exceptionally interesting and well-delivered lecture, on a topic of high relevance, showing how we can all contribute to the progress of science - even if we are not actually employed as scientists.