

The Mt. Paektu Geoscientific Experiment

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Mt. Paektu/Changbaishan volcano is an enigmatic volcano straddling the China — DPRK border. Its most striking features are the ~5.5-km-wide crater at its summit, and the magnificent lake it hosts. The crater was formed during one of the largest known historical eruptions, which took place around the middle of the 10th century CE. The so-called “millennium eruption” resulted in significant tephra fallout as far as northern Japan, highlighting the potential long-range impacts of volcanism on this scale. Since this event, three smaller eruptions have been documented, the most recent of which occurred in 1903. More recently, in 2002–2005, elevated levels of seismicity were recorded beneath the volcano. This has led to increased surveillance and geological work aimed at identifying the structure of the volcano, and revealing further details of the nature of the “millennium eruption”. We will describe a joint UK/US/DPRK project engaged in study of the Korean side of Mt. Paektu/Changbaishan. We plan to deploy a linear array of six broadband seismic stations for one year. Primarily using the receiver function technique, we will image major crustal discontinuities and attempt to reveal where melt may be ponding in the crust. Further, we plan to perform audio-frequency magnetotelluric soundings to determine the conductivity of the crust along the same profile. By highlighting regions of high conductivity and low seismic velocity we will thus show regions of melt storage beneath the volcano. Additionally, we will investigate both seismic and electrical anisotropy, in order to infer the geometry of any magma bodies. We will also carry out new work to quantify the nature and impacts of the “millennium eruption”: this will include experimental studies to determine pre-eruptive conditions, and deposit characterisation (isopach and isopleth mapping and modelling based on an improved dataset with new borehole data) for modelling eruptive processes/dynamics. We will also investigate the record of eruptions that have taken place both prior to and since the “millennium eruption”. We expect to carry out fieldwork in the summer of 2013, following the meeting in Kagoshima and also in summer 2014. This contribution will therefore focus on reporting on the goals and planning for this international project.