

Geothermal Resource Definition at Mt. Spurr, Alaska

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The active, Aleutian-arc stratovolcano Mt. Spurr and its' flank volcano, Crater Peak, are the target of current geothermal exploration in the western Cook Inlet. Lying just 80 miles west of Anchorage, AK, the Mt. Spurr complex serves as both a source of hazard and of potential energy. Recent eruptive episodes ('53 and '92) make development here challenging - but the young nature of the volcanic system (all less than ~255ka), extensive, active faulting, advanced surface alteration suites and fluid chemistries consistent with a geothermal reservoir, also make Mt. Spurr very prospective.

Field reconnaissance in the summer of 2009 (including mapping and surface geochemical sampling) set the stage for a full-scale exploration program in the summer of 2010. The hazardous nature of Mt. Spurr has insured the existence of long-time monitoring and characterization of this volcanic complex (including basic geologic mapping, seismic monitoring and periodic geochemical sampling). In addition, limited geothermal exploration was completed here in the mid-1980's by Wescott et al. (including SP, CSAMT, He & Hg sampling, ice depth surveys and liquid/gas geothermometry). However we still lack a basic understanding of the structural complexity in this region and the intense snow/ice and vegetation coverage in this area has made comprehensive geologic mapping extremely difficult. To remedy this, high resolution satellite imagery coupled with LiDAR kicked off the exploration program, providing base maps (especially structure) of this poorly known edifice. Heli-borne aeromagnetics and an aggressive ground-based geophysical suite of gravity and MT were completed over several months. The synthesis of these datasets with additional geologic mapping, geochemical sampling and two ~1000' core holes have produced a working geothermal exploration model and served to elucidate large scale structural controls on this young volcanic edifice. We plan to target these major structures (where coincident with geophysical anomalies) with additional intermediate depth core holes in the summer of 2011, the goal of which is to define a viable geothermal reservoir (temperature, fluid and permeability).