

Ground-based, Sounding Rocket and Satellite Observations of the Upper Atmosphere and Ionosphere in the Arctic

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The Geophysical Institute (GI) at the University of Alaska, Fairbanks carries out a wide range of geophysical studies using Alaska as a natural laboratory. The research arm of the GI is organized around natural phenomena in the sub-arctic and structured into seven groups including: Volcanology, Seismology; Tectonics and Sedimentation; Snow, Ice and Permafrost; Remote Sensing; Atmospheric Science; and Space Physics and Aeronomy. The latter of these groups carries out investigations of the middle and upper atmosphere, ionosphere and magnetosphere using ground-based, sound rocket and satellite observing platforms. Thirty-five miles from the UAF campus at the Poker Flat Research Range, the GI launches sounding rockets for NASA and other customers into the upper atmosphere and aurora. GI space scientists maintain a number of ground-based sensors across Alaska to measure airglow and upper atmospheric neutral and ion winds. On the range is a lidar facility for middle atmospheric studies. The National Science Foundation maintains an Advanced Modular Incoherent Scatter Radar (AMISR), an incoherent scatter radar to support rocket investigations. At Gakona Alaska the U. S. Air Force operates the High Frequency Active Auroral Research Program (HAARP) active radar for ionospheric studies. GI scientists use this facility and provide ground-based instruments as diagnostic sensors for active experiments. The range of theoretical and experimental space physics research carried out by the GI will be discussed and new concepts for space launch of low-cost space experiments from Alaska will be presented.