

RESEARCH ABSTRACT

Principal Investigator(s):

Dr. Lawrence C. Bliss
University of Washington
Department of Botany KB-15
Seattle, Washington 98195
(206) 543-8917

George D. Reynolds
1298 Holloway Street
Victoria, British Columbia
Canada V8P 1M7
(604) 382-1064

Study Title: Climate/microclimate measurements over disturbed sites at Mount St. Helens

Key Words: physical terrestrial plant soil archives
atmosphere weather climate microclimate precipitation
pyroclastic flow lahar mudflow ashfall zone subalpine

Abstract: Climatic and microclimatic measurements for the summers of 1982 to 1987 were made at three differently disturbed sites around Mount St. Helens. These measurements provided daily information on the physical environment and baseline data for studying the evolution and recolonization of these areas.

Yearly change in the summer conditions greatly influenced soil formation and plant regrowth. Cooler wet summers were more beneficial for seedling establishment and plant growth than the drought periods of the warmer, drier summers.

By 1985, the tephra covered site of Butte Camp recovered to pre-eruption conditions. The 5-8 cm tephra layer acted as a mulch thus preventing excess evaporation from the original soil profile. The mudflow disturbance at Pine Creek acted similarly though slope and aspect of this site were responsible for higher surface temperatures and drier soil conditions when compared to Butte Camp. Desert like conditions existed on the pyroclastic flow near Spirit Lake. The recovery of vegetation at Spirit Lake showed little progress during the study period. High surface temperatures, greater diurnal temperature fluctuations, low soil moisture, erosion from wind and rain and exposure resulted in an inhospitable environment. Energy balance measurements for Spirit Lake and Butte Camp showed high evaporation rates after precipitation events, while under drought conditions the sensible heat flux became the dominant flux over the dry surface.

Type of Measurement(s):

- Air temperature at 5, 10, 25, 125 cm above the surface
- Surface temperature
- Soil temperature at -5, -10, -25, -50 and -100 cm below the surface.
- Incoming shortwave radiation in W/m² and Mj/m²/D.
- Photosynthetically active radiation in uE/s/m²
- Net radiation in W/m² and Mj/m²/D
- Soil heat flux in W/m² and Mj/m²/D.
- Wind speed in m/s.
- Wind direction in degrees.

- Soil moisture in percent.

Frequency of Measurement(s): Hourly and daily means for summers 1982-1987.

Data Storage: Hourly and daily means from 1982-86 are stored on magnetic tape in ASCII format. Hourly and daily means for 1987 are stored on 1.2 mb floppy in ASCII format IBM compatible.

Long-term plans: Data available for collaborative efforts: As of May 1988 the project was terminated.

Reynolds and his data are available for future collaborative efforts. Some data appears in Reynolds and Bliss, 1986.