551.521.14 : 551.578.4

VARIATION OF ALBEDO OF FRESH SNOW

The weather conditions experienced by the snow cover controls the rate of decrease of albedo with age. During accumulation season albedo decreases slowly while in melt season the rate is faster. US Corps of Engineers (Snow Hydrology 1956) found that in accumulation season albedo decreases from 80% to 60% in 20 days, while during melt season albedo decreases from 80% to 40% in 20 days.

In order to understand decrease of albedo with age, albedo variation was studied at two stations in Beas catchment. The study is aimed at modelling decrease of albedo with age.

Short wave incoming and outgoing radiations were recorded continuously at a station (altitude 3100 m). Albedometer (spectral range 0.3 to 3 μ), which consists of two pyranometers one facing up and other facing down, was used for measurement of radiations. The albedometer, as shown in Fig. 1, was mounted 1.30 m above the snow surface. The height of albedometer was adjusted every day during build up and depletion of snow cover. The observations were made continuously during December 1989 to April 1990. The graph shown in Fig. 2 pertains to 14 February 1990 to 22 February 1990 (accumulation season) and 14 April 1990 to 8 May 1990 (melt season).

Snow and meteorological data, *e.g.*, snow/rainfall, snow surface characteristics, cloud condition, ambient temperature, etc. were recorded at both the stations. Albedo values were computed from the graphs of incoming and outgoing radiations. Half hourly values were used to compute average albedo.

Albedo is known to become high after fresh snow fall. Albedo data of day immediately after the snowfall was analysed. It is found that after snowfall albedo becomes 90% during accumulation and 80% during melt season. Charles & Glen (1973) in hydrologic simulation model has provision of resetting albedo value to 80% during accumulation and 70% during melt season. Higher values observed by us may be attributed to relatively lesser pollutants in our environment compared to west.

Decrease of albedo with age of snow surface observed during accumulation and melt season is shown in Fig. 2. During accumulation season when mean temperature is sub-zero albedo decreases from 90% to 81% at a rate of 2% per day for first three days thereafter 1% per day. Higher initial albedo compared to that reported by US investigators (Charles & Glen 1973, Snow Hydrology 1956) is due to cleaner snow. The albedo in accumulation season is reported (Snow Hydrology 1956) to decrease to 60% in 20 days but in present investigations maximum, break of 10 days was observed and albedo decreased from 90% to 78%.

Summary—After snow fall albedo becomes 90% during accumulation and 80% during melt season. During accumulation season albedo decreases from 90% to 80% in seven days. During melt season albedo decreases from 80% to 55% in seven days.

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Fig. 1. Albedometer

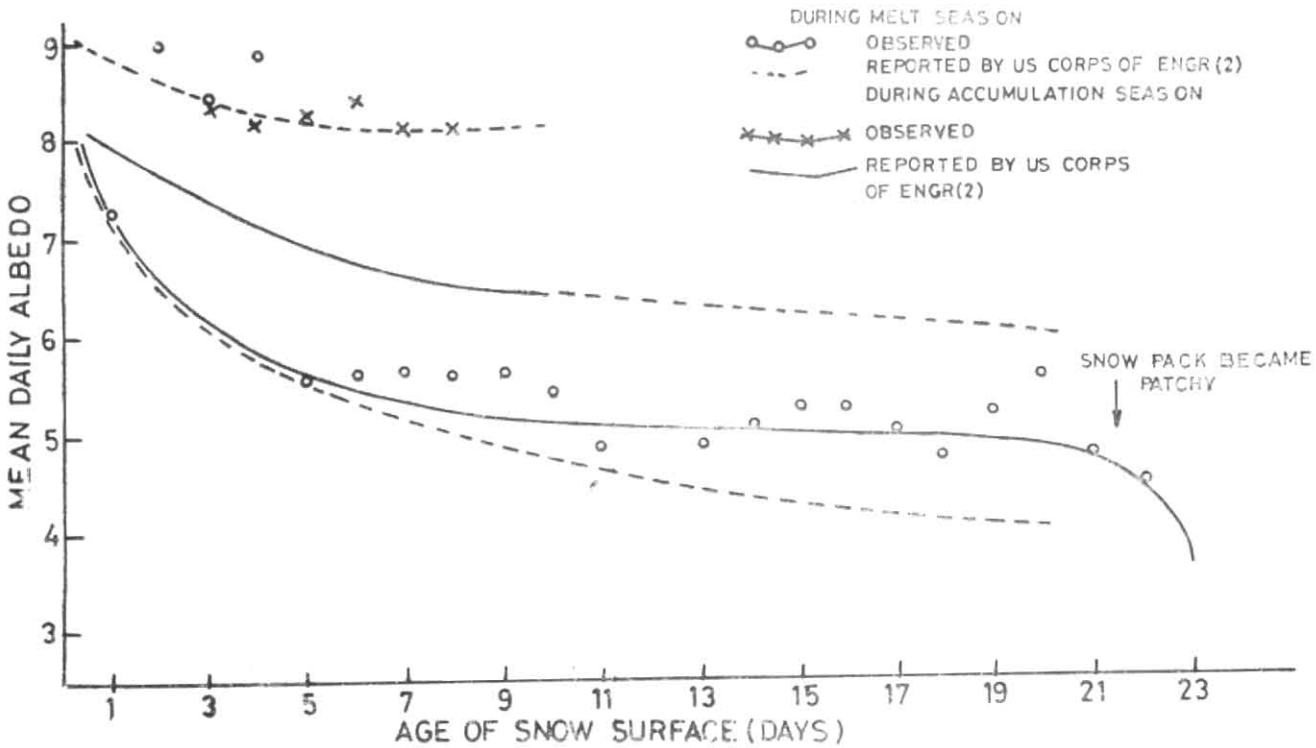

Fig. 2. Variation of albedo with age of snow surface (Station : Dhundi Thach)

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VIRENDRA KUMAR

Naval College of Engg., INS Shivaji, Lonawala,

BIR SINGH NEGI

Snow & Avalanche Study Establishment, Manali

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