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ABSTRACTS OF PAPERS ACCEPTED FOR THE SYMPOSIUM BUT NOT PRESENTED

AN AUTOMATIC SNOW-DEPTH METER USING INFRARED BEAM REFLECTION FROM A SNOW SURFACE FOR THE MEASUREMENT OF THE SNOW DEPTH ON THE ROAD

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ABSTRACT. In order to measure the snow depth on a road, a new type of snow-depth meter based on trigonometry with an infrared beam source, beam reflection points on the snow surface and a detector of the reflected beam, was developed using a gallium-arsenide infrared-emission diode and a silicon infrared-detection dual diode. The prototype of this meter operated successfully from 1 February to 31 March 1975 at Nagaoka, Japan.

In the prototype, an infrared beam source, with 10 mW output power, and a detector were fixed 4 m above the ground facing each other at a distance of 5 m. These two photoelectric elements were set in small light-weight cases. Each has a small window (4 cm × 10 cm) to emit or receive the infrared beam. To avoid catching snow or rain in the windows, air was ejected through them. The visual field of the detector was 4.8° and the dip angle of its centre line was fixed at 45°. On the other hand the beam source emitted with 1.4° divergence and varied its dip angle from 90° to 20° with a period of 4 min in the vertical plane which contains the centre line of the visual field of the detector. This beam was reflected by the snow surface and received by the detector in its visual field. When the detection system of the meter detected the beam centre, the dip angle of the scanning beam was measured by a potentiometer connected mechanically to the infrared source scanner. Output voltages of the potentiometer indicated the measurement of snow depth within an accuracy of ±5 mm for the flat plate or snow surface from 0 to 1.5 m above the ground.

In addition, a phase-sensitive detection circuit with equivalent band-width of 0.4 Hz and driven by a synchronous signal of 1 kHz from the modulation circuit of the beam source was adopted in order to eliminate noise such as occurs due to sunshine, heavy snow-storms or traffic. As a result very reliable movements were obtained under conditions of heavy snow-storms with horizontal visibility less than 30 m at eye level in daytime.

CALCULATION AND PREDICTION OF THE TOTAL GLACIAL MELTING IN WATERSHEDS OF CENTRAL ASIA

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ABSTRACT. A computer method for calculating the total melting from May to October has been developed both for a single glacier and for a glacial area. In the second case (which is the more interesting and important for hydrology and glaciology) it is necessary to calculate some characteristics of an "average" glacier of the region using morphometric characteristics included in the Catalogue of the U.S.S.R. glaciers. These are: glacier area; average area of