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REPORT
SYMPOSIUM ON LARGE SCALE EFFECTS OF SEASONAL SNOW COVER
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This symposium, which was one of six given by IAHS, offered 42 papers and was generally attended by 120-150 people with good representation from North America, Europe, China and Japan. All papers were pre-published in IAHS Publication No. 166 (1987).

The first major topic considered the relationship between continental snow cover and climate. There are now over 20 years of snow satellite information for the Northern Hemisphere in standardised data bases, and this has enabled investigation of the effect of snow covered areas on atmospheric circulation. Results show definite responses of the global weather system when the snow covered area is more extensive than normal, especially over Eurasia. The Chinese, who are increasingly more involved with the International Community on snow research, believe that heavier snow years are associated with El Nino-Southern Oscillation episodes and illustrated that as winter temperatures rise, so also does their snow covered area. This apparently contradictory finding is a consequence of more precipitation in semi-arid areas during warmer winters. New Zealand can learn much from a paper examining the detailed history of snow cover variations over the Swiss Alps, while the great rivers of Pakistan and India, which receive substantial contributions from snow melt in their headwaters, also received attention.

The second major topic examined modelling the snow cover, especially over large river basins (>1000 km^2). A vigorous debate centred around the use of energy balance or temperature index methods to model snowmelt, with the latter being favoured, chiefly because it is easier to obtain or synthesise the required input data. The Martinec model for simulating snow melt runoff remains the most practical and effective of the many available. Simulation of snow accumulation is handled rather arbitrarily in these models and few studies attempt to verify this midpoint stage. My own paper, which suggested that indexing snow accumulation was as effective as modelling it, proved to be contentious, with European support, but North American scepticism in the ensuing lively discussion. A significant, new development presented at the Symposium attempted to model the structure of the snowpack throughout a winter, including depth, density, temperature, and type of metamorphism.

A third major topic considered remote sensing of snow. The measurement of snow water equivalent over extensive areas from aircraft using the terrestial gamma radiation technique is now in operational hydrological use in North America with 1250 flights in 28 states or provinces last year. Several papers

outlined the operational use of satellites which sense in the visible and infrared, and can map snow covered area at spatial resolutions of 1 km (NOAA satellites) down to 10 m (Spot satellite). The problem of obtaining snow depth or water equivalent from satellites still remains, although microwave sensors show some promise, provided the signal response can be corrected for the effects of grain size and snow stratification. A series of papers discussed these research applications, and tentative maps of snow depth were given for large areas such as Alaska, but with a spatial resolution limited to 30 km.

Disappointing features of the symposium were the lack of papers on the Southern Hemisphere, especially the Antarctic which profoundly influences global climate, and the minimal discussion on the likely effects of greenhouse climatic changes on alpine snow covers.