

6 Energy Balance and Hydrological Processes in an Arctic Watershed

L. D. HINZMAN, D. L. KANE, C. S. BENSON, and K. R. EVERETT

6.1 Introduction

Major efforts in recent years to understand global energy and water balances have focused attention on thermal and hydrological processes in high latitudes (Kane et al. 1992). One of our objectives in the R4D program (Chap. 1, this Vol.) was to develop a quantitative understanding of hydrological processes in the Imnavait Creek watershed and the energy flows that drive them. In this chapter we present monitoring data on energy balance, evapotranspiration, precipitation, snow distribution, snowmelt, runoff, and snow damming of runoff during the spring melt. We use these data first to develop budgets and elucidate seasonal and annual patterns; subsequently, we present physical process models that further quantify the dynamics and interactions between thermal and hydrological regimes and provide additional insight with regard to water and energy budgets in tundra ecosystems.