

# CHARACTERISTICS OF PRECIPITATION AND DISCHARGE OF A MOUNTAINOUS BEECH FOREST AREA IN NORTHEASTERN JAPAN

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The Shirakami Mountains located in the northernmost part of Honshu, a Japanese main island, is one of world's first natural heritages in Japan (Fig.1). They are famous for the original Siebold's beech (*Fagus crenata*) forest which covered almost all cool temperate zones in Japan until the early 1960s. Since then, everywhere in Japan beech forests have been cut down and changed into artificial forests of temperate conifers such as *Cryptomeria*, *Chamaecyparis*, *Pinus*, *Larix*, etc. Today, a forest of about 450sq. km. in these mountains is the largest original stand of beech as a continuous mass.

The beech forests on these mountains, together with other arboreal and herbaceous plant communities, offer habitats for many kinds of animals. Some of those animals, such as the Japanese black bear and Japanese serrow, as well as edible and medicinal plants and fungi, have long been natural resources for the people living around the mountains. Also, rivers originating in these mountains are irrigating vast paddy fields till today.

The hydrological characteristics of these mountains, however, have not yet been studied because of the absence of meteorological survey points and inaccessibility (there are few trails here). First, we tried to estimate the precipitation and discharge using the data of discharge for three catchment areas. The results are summarised as follows.

1. Both heavy rainfall and heavy snowfall are inclined to occur during the passage of the Japan Sea Low which blows a southwestern wind at the surface of 900 hPa.

2. Annual areal precipitation estimated by the water budget method ranged from 3,500 to 4,000mm, which is 1.2 to 1.5 times (in summer) or 1.8 to 2.5 times (in winter) as large as the annual precipitation of dam-site stations at the mouths of catchments

(Fig. 2, Table 1). The glaring discrepancy between two annual precipitation is caused by both the increasing precipitation in higher altitude and lowering of the capturing ratio of rain gauges at dam-site stations.

3. Daily discharge in spring is remarkably related to temperature, and, alternately, with precipitation since May. The characteristics of discharge in spring depend upon the distribution of altitude and slope direction for the three catchments.

4. Two Landsat data scenes during the period of lingering snow clarify why more snow accumulation is observed on the north or east sides of slopes than on the south or west sides. The melting snow volume estimated from the two Landsat data is equivalent to the discharge within the period measured at dam-site stations.

Fig. 1. The Shirakami mountains and the World Heritage Area

A solid line surrounds the heritage area of ca. 170km<sup>2</sup>. A : The buffer area of the "Forest ecosystem reserve (Park area)", B : The buffer area of the "Forest ecosystem reserve" and the ordinal zone of the "Natural environment reserve", C : The core area of the "Forest ecosystem reserve (Parka area)", D : The core area of the "Forest ecosystem reserve" and the special zone of the natural environment reserve". The dam-site stations are MY (Nishi-meya), SB (Subari) and HG (Hayaguchi)

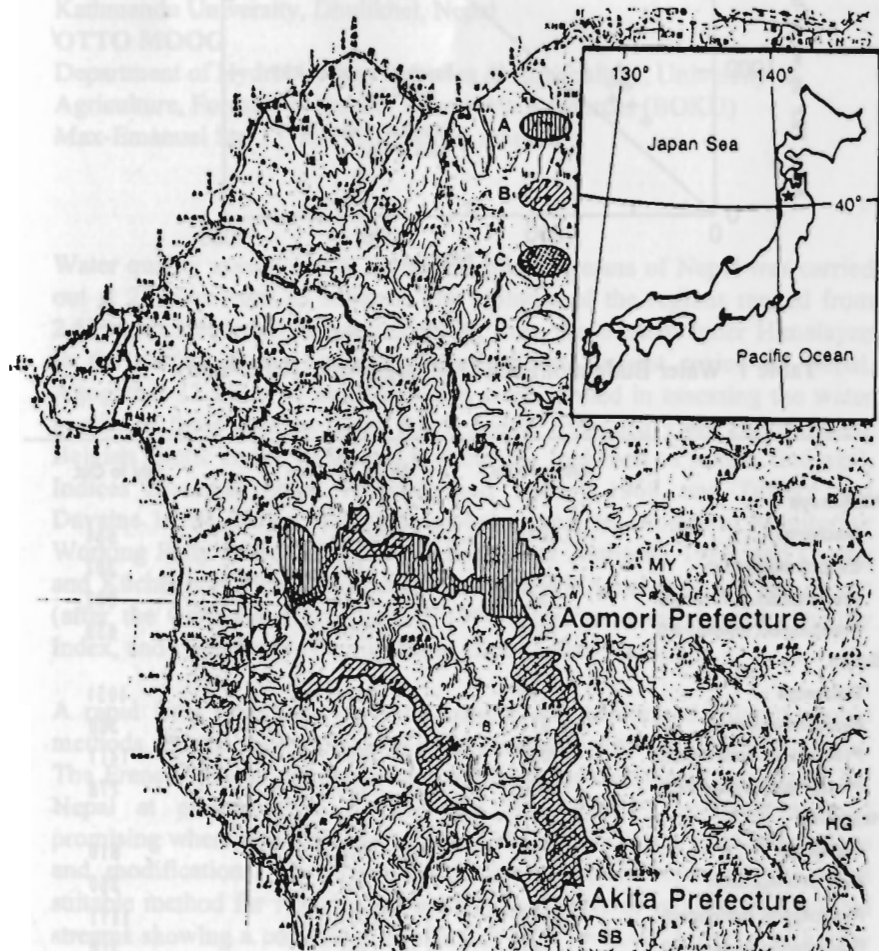


Fig. 2 Comparison between the dam-site precipitation and estimated precipitation

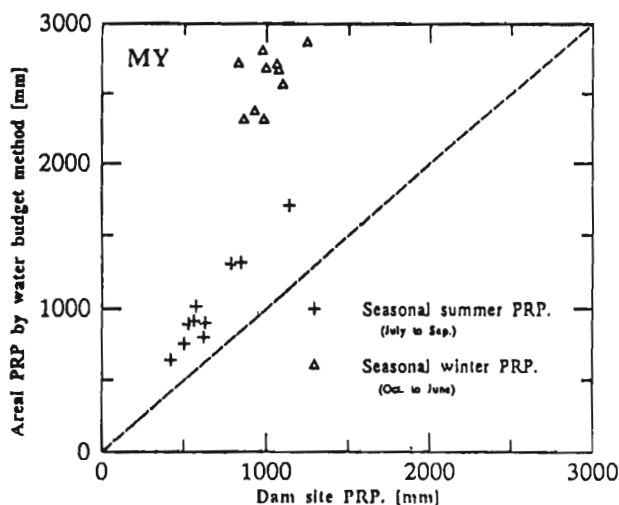


Table 1 Water Budget of Each Discharge Area (Unit=mm)

	Annual total	Nov. to June	July to Oct.
<b>Nishimeya</b>			
Discharge	2844	2158	686
Evapotranspiration	723	416	307
Precipitation (estimated)	3567	2574	993
Precipitation (measured)	1662	1003	659
<b>Subari</b>			
Discharge	3191	2143	1051
Evapotranspiration	811	451	360
Precipitation (estimated)	4005	2594	1411
Precipitation (measured)	1978	1200	778
<b>Hayaguchi</b>			
Discharge	2709	1900	810
Evapotranspiration	811	451	360
Precipitation (estimated)	3520	2351	1171
Precipitation (measured)	1142	967	310