Regional evapotranspiration estimated by using Cl ratio stream water to precipitation in eastern Chugoku district, Western Japan

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In order to study how water qualities of river is formed, stream waters in upper reach of many drainage basins were collected in the region of Chugoku district between Seto Inland Sea and Japna Sea. Rain waters have been collected periodically at 17 observation points distributed in the region for several years. It is noted that Cl concentrations of rain water in annual mean weighted by precipitaion are have a clear exponential distribution with distance from the coast of Japan Sea, suggesting the influence of sea salt transportation with monsoon. On the other hand, the distribution of Cl concentration in stream water has a similar patten to that of rain water. The Cl in stream water is considered to be derived from sea, because there is no origin of Cl in such the uppermost reach of study areas where there are no human activities such as living and agriculture. Furthermore, the Cl concentrations in stream water are higher than those of rain water, suggesting enrichment by evapotranspiration. Then, the annual evapotranspiration amount is to be estimated by taking the ratio of Cl concentration of stream water to rain water. The annual evapotranspiration estimated is somewhat lower than that estimated by Thornthweight method or Pennman method. The difference may be due to direct runoff when there is a heavy rainfall. Thus the annual amount of sum of evapotranspiration and direct runoff can be estimated with accuracy by the method compareing Cl concentrations of stream water with rain water.