

A study on characteristics and water quality of streams in Ishigaki island

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1.Introduction

Water quality of streams and groundwater at the Southwest islands of Japan are generally known as different from those at other parts of Japan. The water quality of them also differs among the Southwest islands and is diverse at Ishigaki island (Agata, 1994). Red soil run off is one of the hydrologic matters in Okinawa prefecture and studies of moving state of soil and the runoff of nutritive salt are carried out at the unit of streams of Nagura river and Todoroki river. Although a number of studies have been made on the unit of streams, only few attempts have so far been made on the comparison of streams and the study of positioning each stream. The purpose of this paper is to clarify the characteristics of streams and wide distribution of water quality at Ishigaki island.

Ishigaki island is located at sub-tropical region and the area of about 222.83km², which is the third largest island in Okinawa prefecture. Mountain range of Omoto lies Northern part and peninsulas stretch toward both West and East. As flatland widens at southern part of the island, where land improvement enterprises had done, food production such as sugar canes, pineapples have been flourishing. The Southern urban area has the concentration of population and there are a few villages across the island.

2.Method

The hydrological observations were done at 45 points mainly southern part of the island in May and at 59 points in the whole area in August, 2008. Matters for investigation are water temperature, pH, RpH, COD, EC, DO. Alkalinity determination, and the analysis of cations, anions, T-N, T-P were performed at the laboratory. To compare river basins, water systems and land use were drawn, using at the topographic map and the digital national land information, and the characteristic of 27 stream basins which were observed and land use were computed

3.Result

There are a number of small streams which areas are under 5km² except Miyara river, Nagura river, Todoroki river, and the lengths of the main streams are shorter than 5km. The profiles of streams can be divided for the streams of the steep slope, of the gentle steep between 0.5-1km from the mouth of rivers, of rarely gentle steep for whole stream basin. There are the correlation of water system frequency and percentage of forests, water system frequency and water system density. Water of the streams belongs to Carbonate hardness, Noncarbonate hardness, Noncarbonate alkali and stream water of run from Omoto granite contains particularly small amount of ions. The water quality of the middle of island shows carbonate hardness which is affected by the limestone, particularly southeast part is more remarkable.

Measuring ions in May and August, high concentration of ions appears in August, which suggests the quantity of dissolved materials is larger in summer. The T-N concentration is high in Shinkawa river, Todoroki river, and Ayamashi river which is the branch of Miyara river. This is because of the inflow of domestic waste water and the influence of farm production.

4.Conclusion

This study suggests that water quality of Ishigaki island is diverse and there are basin streams which is strongly affected by human activities. Material flow from land to ocean would be increased at torrential rains in summer. For this reason, it is essential to research material flow of flood water as to compare with the average water level of streams.

5.Reference

Agata,S., 1994:Water quality of inland water in Ishigaki island,Okinawa,Industrial Water,434,35-46.
 Yoneyama,A., Kodera,K., Iizumi,Y., and Terazono,A., 2008:The characteristic of streams and material flow in Ishigaki island, Abstracts of Japanese Society of Physical Hydrology, 17.

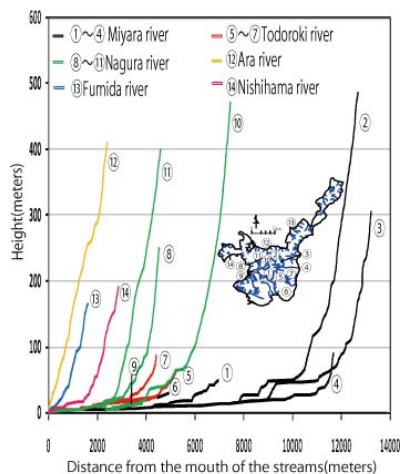


Fig.1 Profiles of streams

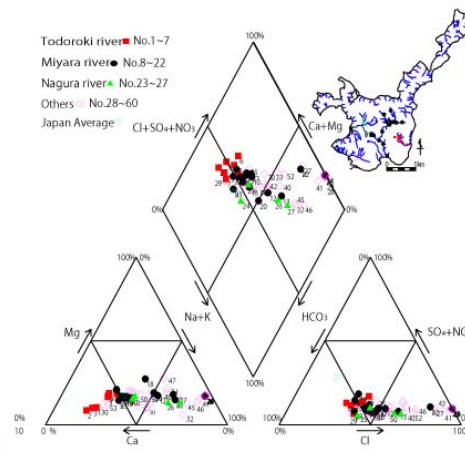


Fig.2 Trilinear Diagram

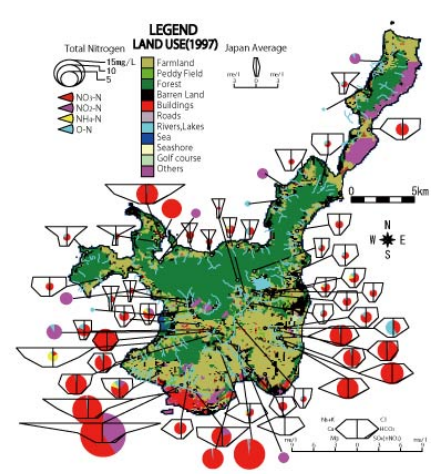


Fig.3 Water quality and T-N concentration