

A study on the characteristics of basin and the factor of water quality of rivers in Ishigaki Island

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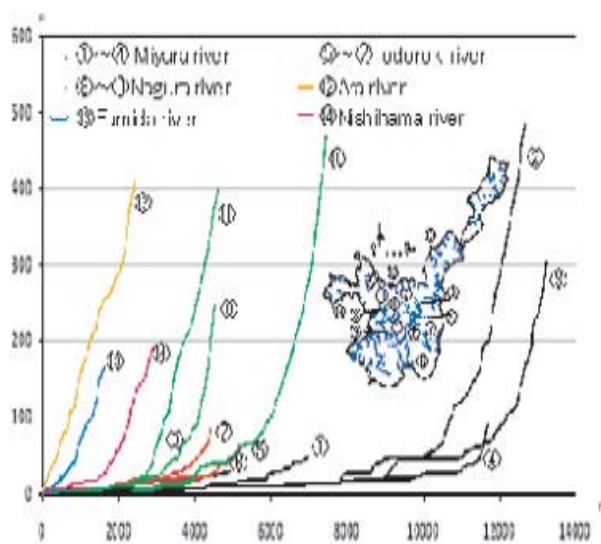


fig.1 profiles of rivers

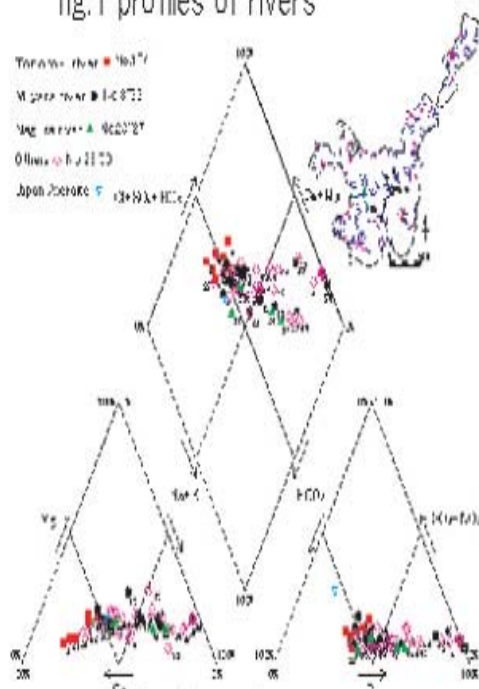


fig.2 triliner diagram

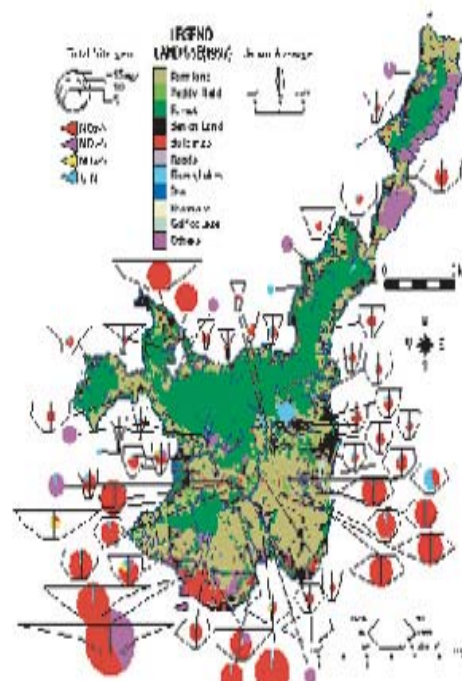


fig.3 water quality and T-N concentration

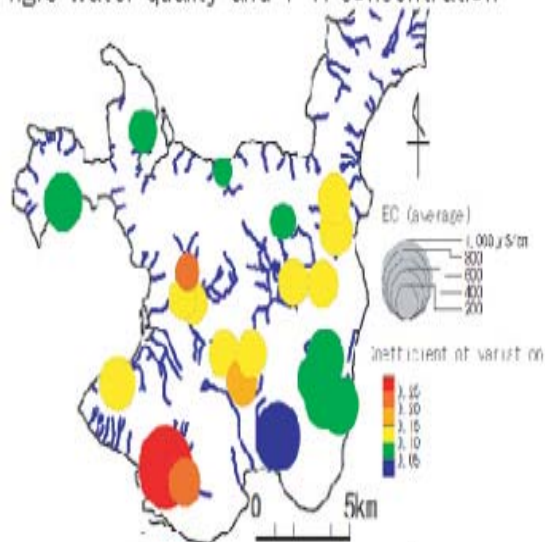


fig.4 EC (average and variation)

1. Introduction

The water quality of streams at the Southwest islands of Japan is different from those at other parts of Japan. It is known that Ishigaki island which lies at Ryukyu Arc near Taiwan has a variety of water quality within the island (Azumada, 1994). Red soil run off is one of the hydrologic matters in Okinawa prefecture and researches at the unit of major streams are advanced. Although only few attempts have so far been made at comparing streams includes small streams and positioning each streams. The purpose of this paper is to clarify the characteristic of streams and wide distribution of water quality at Ishigaki island.

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

2. Methods

The hydrological observations were done for 45 points mainly southern part on May, 59 points for the whole area in August, 2008, 75 points in February, 2009, 93 points in August, 2009, and 93 points in October, 2009. Matters for investigation are water temperature, pH, RpH, COD, EC and DO. Alkalinity, main ions, T-N, T-P, DOC were analyzed at the laboratory. Water systems and land use were drawn out of 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. Results

A number of small streams which areas are under 5km² except Miyara river, Nagura river, Todoroki river and lengths of the main streams are shorter than 5km are figured. The Long 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. These differences appear on the impact of the landform. And also water system frequency and percentage of forests, water system frequency and water system density has the correlation. 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 stream water of southern part is more likely to show Carbonate hardness which is affected by the limestone compares to the middle part of the island. The formation of water quality is more likely to be affected by the geological features. T- N concentration is high in Shinkawa river, Todoroki river, Ayamashi river which is the branch of Miyara river because of inflowing domestic waste water and farm production.

4. Conclusion

Diversity of water quality and stream basins which is affected by human activities are suggested. As to compare each stream, more specific vegetation and geological information are needed. Material flow from land to ocean would be increased at torrential rains in summer, thus it is essential to research material flow of flood water as to compare with the average water level.

Keywords: Ishigaki Island, characteristics of river basin, water cycle, material cycle, basin model, unit basin method