A study on river conservation and management using the information of water environment and GIS in the Abukuma river basin

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1. Purpose

Global environmental concerns become serious, and the conversion period for the water resource administration comes. In the plan, the report, and the proposal, the necessity for promoting the administration that values the water circulation is emphasized.

Then, the water quality characteristic was understood by a local observation in this research for the Abukuma river basin. And, the basin model by whom the characteristic of a land use and each unit basin was considered made. The grasp of a more detailed basin environment was tried by analyzing the pollutional load from them.

2. Study area

The Abukuma river originates the source in mt. Asahi flows into the Pacific Ocean agricultural area and some city regions in the Nakadouri area. It through the narrowed area in the Abukuma valley after northing, and is a class A river of the length of river channel 239km and 5,400km^2 in the drainage area.

3. Method

It local observed 22 all times in the Abukuma river basin until November, 2007 in June, 2005 in the Abukuma river basin. As a result, the change was understood during the year of the water quality in the fixed point. And, to see an artificial influence in a time change, the influence of drain set up the logger in the seen point, and observed it to the water quality.

The unit basin field that made 100m land use mesh of the Abukuma river to analyze the result in a local observation, analyzed 50m DEM in the lusterware, and was extracted was assumed to be a base map. The T-N loading dose was calculated from them by the Unit Basin Value Method. The water budget tried modeling an effective rainfall that became an input of the tank model. The feature of the distributed parameter system model was considered and a rainfall loss and underground infiltration according to the land use of taking part, and various meshes were considered. Moreover, because this model applies the tank model to the downstream part of each unit basin, the influence of the land change can be analyzed.

4. Result

The tendency that the value of the water quality of the irrigation period rises most in the Abukuma basin through years was able to be read from the result of a local observation because water flows to rainwater etc. by the irrigation period because of the agricultural region, the upstream region is thought to be a flow of the accumulated load. It seems that not only the farmland origin but also the load in which stock raising etc. are assumed to be an origin is included as for the breakdown of this load. Moreover, the feature was seen by the difference of the land use in the water quality and the formation process.

In addition, drained influencing the river water quality from the long-term water quality change investigation by logger became clear though the water quality was improved by the spread of drainage in the Abukuma river basin because a respect load is consolidated and exhausted in the point.

The pollution load is often calculated with the administration field base to which statistical information is maintained now. It is necessary to repeat another and the statistical information of a technical problem such as going out of the individual variation to the extraction of the basin field maintenance, and to convert it into the state that can be used when dividing by the unit basin. A peak value of the increase and decrease almost equal to the value of the observation point that reached the measurement value because it tempered with the influence of the snow for the water balance model were able to be obtained.

5. Conclusion

In this research, the individual variation was assumed to be the mechanical one by extracting the unit basin field from 50m DEM automatically. In addition, when the scenario analysis and the event analyzed in the future, it will be thought it is useful because the water balance model of this research is the one with the same mesh as the mass balance model.

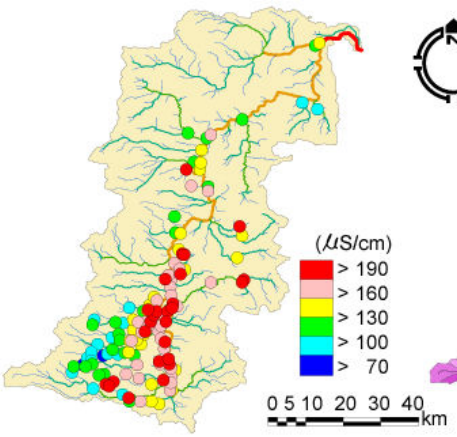

Fig. 1 Abukuma river basin

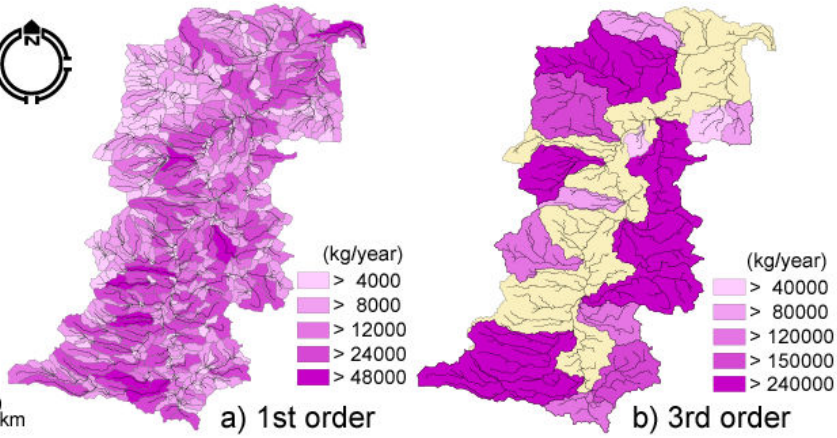

Fig. 2 Calculation result of the amount of load