

## 小豆島における河川水質の特徴 -河川物質マップの作成-

## Characteristics of River Water Quality in Shodo-shima Island -Drawing a material Map in Rivers -

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## [Introduction]

In Kagawa Prefecture, where water resources are low, the accumulation of organic matter in the rivers downstream has become a problem (Yamada et al. 2015). For the cause analysis of organic contaminant, it is necessary to clarify its origin and load process and is essential to make a material map as the database of substance concentration.

So far, we have reported a material map in rivers in Shikoku Island. This time, by drawing a material map of Kagawa Prefecture, including Shodo-shima Island, the relationship between the river water quality and the river's basin environment will be analyzed, especially regarding Shodo-shima Island.

## [Methods]

In 27 rivers and 125 points of the entire area of Shikoku Island (Kagawa Prefecture) and Shodo-shima Island, water sampling was performed in August 2011. The items analyzed were main dissolved ions, chlorophyll *a* (Chla + Pheo), particulate organic carbon (POC) and particulate organic nitrogen (PON), and dissolved silicate (D-Si).

## [Results and Discussion]

In Shikoku Island, POC was from 26 mg L<sup>-1</sup> to 3232 mg L<sup>-1</sup>. As POC and Chla have a correlation ( $r^2=0.54$ ,  $p < 0.001$ ), it can be said that the main components of POC in the rivers are algae.

Additionally, when multiple regression analysis was performed by setting the population density, domestic animal wastes, the density of reservoir and the amount of precipitation as explanatory variables, as the effects of the density of reservoir were shown to be especially significant (standard partial regression coefficient 3.54,  $p = 0.001$ ), it can be considered that the algae produced in the reservoirs are the origin of POC in the rivers.

In Shodo-shima Island, POC was from 90 mg L<sup>-1</sup> to 5277 mg L<sup>-1</sup>, which was higher compared to Shikoku Island, especially in the southern part. Furthermore, as POC and Chla have no correlation and C/N was as high as 14 on average, it can be said that higher forms of life contribute greatly to the organic matter within the rivers of the southern part of Shodo-shima Island. When comparing the ratio of forest in the basin of the river with C/N of the downstream end, both the ratio of forest and C/N ratio were high in most of the points in the southern part of Shodo-shima Island.

Accordingly, it seems that the ratio of forest has a great influence on the composition of POC. Additionally, examining the relationship between the quantity of river water and POC, POC became high at the points when the quantity of the river water was small.

The D-Si of Shodo-shima Island became higher compared to that of Shikoku Island (Shikoku Island average: 7.53mg L<sup>-1</sup>, Shodo-shima Island average: 13.6 mg L<sup>-1</sup>). In particular, it tended to be high at the points of granites, while it became low at the points where there is basalt in the upstream that contains Hyp-Aug-01 basalt containing a small amount of silicon. When comparing the D-Si of the source of the rivers in Shikoku Island and Shodo-shima Island, which include granite with the amount of precipitation of the basin, it was found that there was a negative correlation. It was found that, as Shodo-shima Island has a small amount of precipitation, D-Si become high.

Furthermore, by setting up the prediction formula for precipitation at the granite area points in Kagawa Prefecture, the D-Si of the other nature of the soil of Shodo-shima Island was corrected by the amount of precipitation. As a result, it was found that D-Si was higher at the points of andesite compared to the points of granite. It is considered that much silicate has been eluted because the geological age of andesite of Shodo-shima Island is new.

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