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Evaluation of relationship between climate change and monthly rainfall, temperature in the city of Fukuoka Japan, using self-organizing map

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Self-Organizing Map (SOM) has been developed by Kohonen as a clustering algorithm. SOM is a quite useful method to classify data depending on their geometric similarities. One of the advantages of SOM is that SOM can visualize the classification results on the 2-Dimensional map. Many studies have been conducted to identify the relationships between climate change and its influence on hydro-meteorological variables. Most of the studies carried out in this area use linear correlation method to identify the relationships between the variables. However, what linear correlation method is able to do is to identify linear relationship between the variables, and therefore how to identify the significant variable has been one of the important issues in this area. This study utilizes SOM to evaluate relationships between climate indices and monthly rainfall, temperature in Fukuoka, Japan. The procedures used in this study are as follows. As the first step, SOM was employed in order to classify 5 kinds of climate indices, which are Southern Oscillation Index (SOI), Pacific Decadal Oscillation Index (PDOI), North Pacific Index (NPI), Dipole Mode Index (DMI) and Arctic Oscillation Index (AOI). Each of those indices characterizes climate in wide area. As the results of SOM application for those climate indices, past climate represented by the indices were classified on the 2-Dimensional map. As the next step, we selected each of the climate pattern classified by SOM, and examined corresponding 1 to 12 months lagged monthly rainfall and temperature in Fukuoka, Japan against the climate pattern. By doing this analysis, we examined the connections between specific climate pattern and occurrence of extreme rainfall and temperature in Fukuoka.

