Department of Civil Engineering

Quantification of precipitation depth-area relationships for various durations

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| Research Fields	Stochastic hydrology
Keywords	DAD analysis, climate change

● Research Outline

DAD ANALYSIS

Hydrologic design is used to develop plans for a new structure, such as a flood control levee, to develop management programs for better control of an existing system. For an areal precipitation, DAD analysis is useful. DAD means depth-area relationship and depth-duration relationship. In Japan, radar AMeDAS data is useful for DAD analysis. Rader AMeDAS data is publicated by Japan Meteorological Business Support Center, data exists from 1988 to 2012. A spatial density of Radar AMeDAS data is 5km(1988-2001), 2.5km(2001-2005), 1km(2005-). From 1976 to 1987, AMeDAS data is useful, but spatial density of AMeDAS data is about 17km. So, spatial interpolation is carried out for AMeDAS data, and accuracy interpolation is discussed.
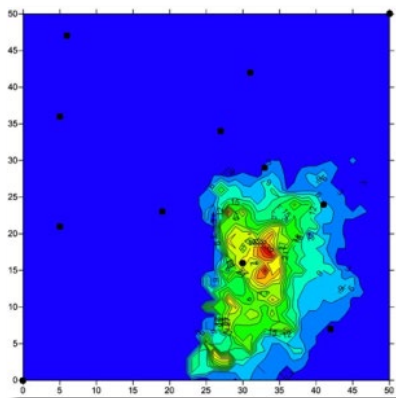

Rader AMeDAS data
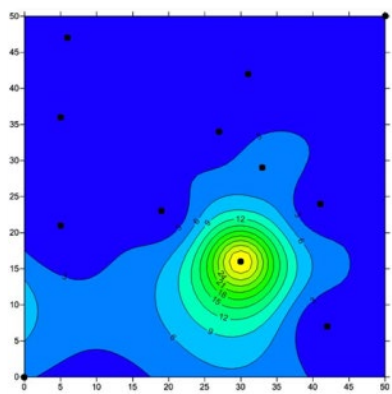
Interpolataed AMeDAS data

TREND ANALYSIS

Global climate change is concerned, for example global warming, frequency of extreme meteorological events. To verify a global change, statistical method is effective. A test for certification of trend, two method are carried out. One is linear regression model and the another is Mann-Kendall statistics model. Linear regression model is assumed that the data distribution is Normal distribution. So, if a deviation from mean of data is large, a trend of data is significant. On the other hand, Mann-Kendall statistics model is non parametric method. So a deviation form mean to data does not influence the testing of trend.
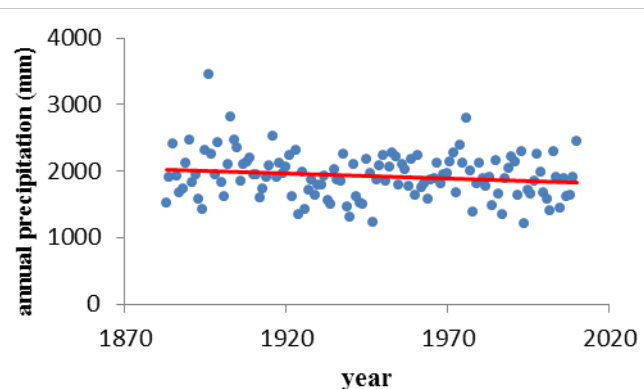
Trend of annual precipitation in Gifu
Linear regression model : 7% significant
Mann−Kendall model : not significant
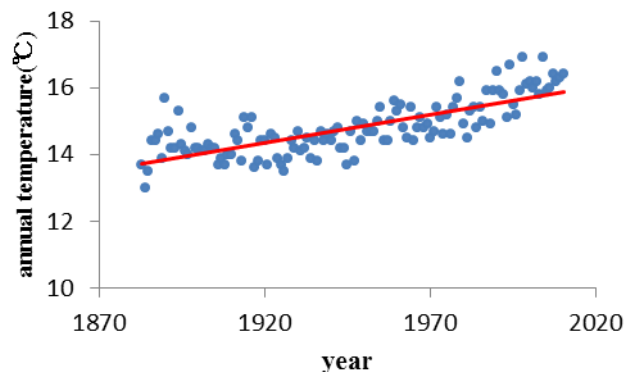
Trend of annual mean temperature in Gifu
Linear regression model : 1% significant
Mann−Kendall model : 1% significant