Optimal estimation of the model covariance matrix of oceanic data assimilation system by neural network method

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In this paper, we propose a method to estimate the model covariance matrix (MCM) of oceanic data assimilation system (ODA) on the basis of the neural network method. Firstly, we suppose that MCM can be described by a unified formula (Gaussian type function) and its value is determined by the amplitude and the correlation length, which are spatial and time function. Then, we construct an object function consisting of squared deviation of ODA from the observations on some points selected previously. The neural network is trained by optimizing this object function so that a relative reasonable shape of MCM may be obtained.

Using the observation data from 1997 to 2001, we have performed several numerical experiments on ODA of National Climate Center of China (a 3DV assimilation system) and get a MCM by this method. Then, we run ODA with this MCM from 1982 to 2003. Comparing with NCEP's results, ODA and this MCM has been improved obviously.

Key words: Data Assimilation, neural network.