Geophysical Research Abstracts, Vol. 8, 10356, 2006
SRef-ID: 1607-7962/gra/EGU06-A-10356

A two-stage ANN to predict littoral drift

Arvind K Singh (1), **M.C. Deo** (1) and Sanil Kumar (2)

(1) Indian Institute of Technology, Bombay, India (mcdeo@iitb.ac.in / Fax: +91 22 2576 7302), (2) National Institute of Oceanography, Goa, India

An accurate estimation of the amount of littoral drift is normally difficult to make because the underlying physical process involved is too complex to model in the form of mathematical equations - either parametric or differential. Despite this, workable empirical formulae that relate the drift to a set of causative variables are currently in use. They are based on collection of measurements in the field or on hydraulic models and performing a curve fitting exercise. The technique of curve fitting normally employed is non-linear statistical regression. It is well known by now that the soft tools like artificial neural networks (ANN) provide many times a better alternative to the statistical methods. However application of the ANN suffers from problems like lack of guarantee of success, arbitrary accuracy, difficult choice of training schemes, architectures, learning algorithms, control parameters and so on. Any new application of the ANN that addresses these issues therefore deserves attention of the potential user community. The current study is directed along this line. It deals for the first time with application of the ANN to determine the littoral drift from a variety of causative variables.

Novel methods of network training are employed in this study, which also involve using a cause-effect modeler first and a simple recycler network thereafter.

An equation combining the ANN and the non-linear regression is presented for those desirous of making hand calculations.

In order to understand why the ANN performed better than the regression a parametric variation of the output against all causative variables is studied. Figures are drawn to understand how the trained network as well as the regression processed the input.

The network is trained with the help of field observations. The location belonged to a four-km stretch of coast, off Karwar, along the western coast of India. National

Institute of Oceanography at Goa had collected these field measurements over the period of four months starting from 5^{th} February 1990.