Geophysical Research Abstracts
Vol. 14, EGU2012-13764, 2012
EGU General Assembly 2012

Identifing CO_2 bio-geochemical cycle for the ground-atmosphere system by artificial neural networks.

FF Paes, HF Campos Velho, and FM Ramos

Instituto Nacional de Pesquisas Espaciais (INPE), Laboratorio de Computacao e Matematica Aplicada (LAC), Sao Jose dos Campos, Brazil (haroldo@lac.inpe.br, +55 12 3945-6375)

The estimation bio-geochemical cycle for the greenhouse gases is a relevant issue for atmospheric environment. This identification problem can be characterized an inverse problem. In the inverse analysis, an area source domain is considered, where the emission or absorption rate is assumed unknown. The identification problem is solved by using a supervised artificial neural network: multi-layer perceptron, with back-propagation scheme is employed to the learning process. For the numerical experiments, the forward problem is addressed by a source-receptor scheme, where a regressive Lagrangian model is applied to compute the transition matrix. The inverse problem methodology is tested with synthetic observational data, from six measurement points in the physical domain. The inversion is improved by including the wind field information, associated with the six concentration sensor measurements. The methodology is also applied with the satellite data.