ACS> Vol.2 No.2, April 2012

OPEN ACCESS

A General Purpose Analysis Package

PDF (Size:2635KB) PP. 210-221 DOI: 10.4236/acs.2012.22022

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ABSTRACT

This paper presents a general-purpose analysis package able to solve two- and three- dimensional analysis problems. The system can use the following methods of solution: Successive Approximation (SA), Optimal Interpolation (OI), and 3D-Var. Analyses are given for the following parameters: zonal and meridional wind components, temperature, relative humidity, and geopotential height. The analysis package was applied to produce analyses at 6 h time interval for the period 1-11 August 2008. The period was selected for data availability and forty-one analyses were collected. The results show the validity of the different solutions, which can be chosen depending on the physical problem to solve and on the computational resources available. In particular, assuming the observations as the reference, all solutions show a decrease of the RMSE compared to the background. The decrease is consistent with the particular setting of the analysis system used in this paper. The comparison between different solutions shows that the SA converges to OI in few iterations, and that the SA solution with ten iteration is, in practice, equal to OI. Moreover, the 3D-Var method shows its potential to improve the analysis, once the horizontal and vertical length-scales and the background and observational errors are set optimally, because its solution may be sizeably different from two-dimensional methods.

KEYWORDS

Analysis Methods; Two- and Three-Dimensional Analysis; Statistical Methods; Background and Observational Errors; Error Decorrelation Length-Scale

Cite this paper

S. Federico, "A General Purpose Analysis Package," *Atmospheric and Climate Sciences*, Vol. 2 No. 2, 2012, pp. 210-221. doi: 10.4236/acs.2012.22022.

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