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OpenDA Open Source Generic Data Assimilation Environment and its Application in Process Models

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Data Assimilation techniques are essential elements in state-of-the-art development of models and their optimization with data in the field of groundwater, surface water and soil systems. They are essential tools in calibration of complex modelling systems and improvement of model forecasts. The OpenDA is a new and generic open source data assimilation environment for application to a choice of physical process models, applied to case dependent domains. OpenDA was introduced recently when the developers of Costa, an open-source TU Delft project [http://www.costapse.org; Van Velzen and Verlaan; 2007] and those of the DATools from the former WL|Delft Hydraulics [El Serafy et al 2007; Weerts et al. 2009] decided to join forces. OpenDA makes use of a set of interfaces that describe the interaction between models, observations and data assimilation algorithms. It focuses on flexible applications in portable systems for modelling geophysical processes. It provides a generic interfacing protocol that allows combination of the implemented data assimilation techniques with, in principle, any time-stepping model duscribing a process(atmospheric processes, 3D circulation, 2D water level, sea surface temperature, soil systems, groundwater etc.).

Presently, OpenDA features filtering techniques and calibration techniques. The presentation will give an overview of the OpenDA and the results of some of its practical applications.

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COSTA a problem solving environment for data assimilation applied for hydrodynamical modelling, Van Velzen and Verlaan (2007), Meteorologische Zeitschrift, Volume 16, Number 6, December 2007 , pp. 777-793(17).

Application of generic data assimilation tools (DATools) for flood forecasting purposes, A.H. Weerts, G.Y.H. El Serafy, S. Hummel, J. Dhondia, and H. Gerritsen (2009), accepted by Geoscience & Computers.