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A hybrid data assimilation scheme for model parameter estimation: application to morphodynamic modelling. (English) Zbl 1432.86005

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Summary: We present a novel algorithm for joint state-parameter estimation using sequential three dimensional variational data assimilation (3D Var) and demonstrate its application in the context of morphodynamic modelling using an idealised two parameter 1D sediment transport model. The new scheme combines a static representation of the state background error covariances with a flow dependent approximation of the state-parameter cross-covariances. For the case presented here, this involves calculating a local finite difference approximation of the gradient of the model with respect to the parameters. The new method is easy to implement and computationally inexpensive to run. Experimental results are positive with the scheme able to recover the model parameters to a high level of accuracy. We expect that there is potential for successful application of this new methodology to larger, more realistic models with more complex parameterisations.

MSC:

86-08 Computational methods for problems pertaining to geophysics

86A05 Hydrology, hydrography, oceanography

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[data assimilation](#); [morphodynamics](#); [parameter estimation](#); [state augmentation](#)

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