



Developments of a dynamically consistent targeting and assimilation method

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The ability of a data assimilation system to control the instabilities, present in the forecast error and responsible for error growth, can be improved by the combination of targeting strategies and dynamically consistent assimilation. The benefit of adaptively located observations is greatly enhanced if their positions and their assimilation are designed in order to target the instabilities, estimated by Breeding on the Data Assimilation System (BDAS). The analysis update has locally the same structure as the unstable structure; when adaptive observations are introduced, they are located where the unstable structure attains its maximum amplitude. Two different applications of this method are presented. In a quasi-geostrophic model, the method is applied to assimilate adaptive observations and results are compared with standard 3DVar. In a primitive-equation ocean model the method is applied to assimilate either standard SSH observations only or standard plus adaptive observations. In all cases the dynamical assimilation proves to be efficient in stabilizing the system and reducing the analysis and forecast error. Extension to a 4-dimensional version of the assimilation scheme is in progress.