



Singular vector targeting: is the past as important as the future?

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Singular vectors have long been used to identify a-priori the best sites for making supplementary observations. These targeting methods have predominantly utilised singular vectors which optimise the predicted perturbation growth from the time at which the additional observations are to be taken, to the time at which the subsequent forecast is to be verified. This has led to a reliance on the initial norm used in the singular vector computation to inform the choice of observation location about the expected analysis errors at the observation time. Consequently research has moved in the direction of identifying norms which most accurately represent the analysis error covariance matrix. More recently publications have indicated that analysis error, particularly in poorly observed regions, may also be highly dependent on the atmospheric flow prior to the observation time.

If analysis errors do indeed depend on the preceding atmospheric flow, then a targeting method that explicitly combines this information with that concerning the evolution of perturbations contained in the singular vectors should prove more successful. A new targeting method which aims to achieve this by combining singular vectors which optimise growth before the observation time with those which optimise growth between the observation and verification times will be presented. The relative success of the method will also be shown with results from numerical experiments using a simple quasi-geostrophic model.