3dVar analysis of glider data with a hybrid covariance model

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A forecast error covariance model for assimilatiing glider data is proposed. It is based on the assumption of statistical independence of the errors described by the leading dynamical modes and by the small-scale components of the errors' projection on the subspace orthogonal to that modes. The associated cost function penalizes error projections on the modes and the magnitude of the high-pass filtered projection of the errors on the orthogonal subspace.

The covariance model is tested by assimilating glider observations into the NCOM model. It is shown that the proposed forecast error covariance approximation provides better forecast accuracy compared to the Gaussian error covariance model widely used in sequential data assimilation of oceanographic data.