

Joint analysis of marine sea level pressure and surface winds components

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Reduced space optimal estimation approach is used to produce combined analyses of surface winds and sea level pressure. Geostrophic balance (alternatively, three term frictional balance) is introduced as a weak constraint. This results in improved analyses, compared to the univariate cases. Large-scale aspects of interannual wind variability are faithfully reproduced. Scale of variability plays an important role in the quality of reconstruction: tropical Pacific winds are reconstructed with higher signal-to-noise ratio than those in the tropical Atlantic Ocean. Possibility of detrending wind data by using pressure-based constraints is studied.