## Exploring joint data assimilation in a coupled two-layer diffusion-advection state space model of the atmosphere-ocean system

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A simple linear state space model representation of the coupled atmosphere-ocean system has been employed to critically examine the advantages and disadvantages of independent versus joint assimilation. The assimilation was carried out using a linear Kalman filter technique. In independent assimilation, data was assimilated into each of the respective media and the information was communicated between the media only through the coupling terms. In joint assimilation, the data was assimilated into each of the respective media but the information was immediately transferred to the other medium through the Kalman Filter and both media were updated simultaneously at each assimilation stage. Significant improvements in forecast skill were observed when joint assimilation was carried out as compared to independent assimilation. In particular, the estimation of and sensitivity to the atmosphere-ocean exchange coefficients will be discussed. This research is being conducted to assess assimilation strategies for use in coupled atmosphere-ocean numerical models.