## Improvement of the GEOS-5 AGCM upon upgrading the air-sea roughness parameterization

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Small changes in the surface layer parameterization over oceans leads to a widespread decrease in model biases in the GEOS-5 AGCM. Surface winds, stationary waves, momentum fluxes, heat fluxes, and cloud distribution, are all improved relative to a control run. Fidelity to observations is improved in a 2x2.5 degree run without stratospheric chemistry, in a 2x2.5 degree run with stratospheric chemistry, in a 1x1.25 degree run, and in a series of 0.25 degree forecasts. It appears that other GCMs (both for operational weather forecasting and climate) use a similar class of parameterization; we therefore expect that results from GEOS-5 are relevant to other models as well.