Contrary to the claim of Pielke and Christy, our simulated ocean heat storage (Hansen et al., 2005) agrees closely with the observational analysis of Willis et al. (2004). All matters raised by Pielke and Christy were considered in our analysis and none of them alters our conclusions.

The Willis et al. measured heat storage of 0.62 W/m^2 refers to the decadal mean for the upper 750 m of the ocean. Our simulated 1993-2003 heat storage rate was 0.6 W/m^2 in the upper 750 m of the ocean. The decadal mean planetary energy imbalance, 0.75 W/m^2, includes heat storage in the deeper ocean and energy used to melt ice and warm the air and land. 0.85 W/m^2 is the imbalance at the end of the decade.

Certainly the energy imbalance is less in earlier years, even negative, especially in years following large volcanic eruptions. Our analysis focused on the past decade because: (1) this is the period when it was predicted that, in the absence of a large volcanic eruption, the increasing greenhouse effect would cause the planetary energy imbalance and ocean heat storage to rise above the level of natural variability (Hansen et al., 1997), and (2) improved ocean temperature measurements and precise satellite altimetry yield an uncertainty in the ocean heat storage, ~15% of the observed value, smaller than that of earlier times when unsampled regions of the ocean created larger uncertainty.

We take the (anthropogenic) indirect aerosol forcing as –1 W/m^2, with an uncertainty of a factor of two, based on empirical and modeling evidence (Hansen et al., 2005). The value –0.77 W/m^2 for the interval 1880-2003 follows from the non-linearity of the phenomenon. We note that a larger (smaller) value, combined with smaller (larger) climate sensitivity, could also yield global temperature change consistent with observations, but the agreement that we find with observed ocean heat storage favors a climate sensitivity not too different than that of our model (2.7°C for doubled CO_2). This inference can be sharpened if ocean heat storage and aerosol changes are both measured accurately in coming years.

There is no fundamental disconnect between our conclusions regarding the location of heat storage anomalies and the observational analysis of Willis et al. Large heat storage anomalies penetrate only the upper 200 m of ocean in the tropics in our model, but much deeper at middle to high latitudes, consistent with observations. We note the absence of ENSO variability in our coarse resolution ocean model and Willis et al. note that a 10-year change in the tropics is badly aliased by ENSO variability. Given also the large unforced variability of the distribution of ocean heat storage among our 5 model runs, there is no expectation that simulated geographical patterns of heat storage should match in detail those of observations. Yet the large heat storage at mid-latitudes of the Southern Hemisphere, the geographical feature emphasized by Willis et al., is indeed captured in our simulations (Fig. S2 of our paper).

By using observed changes of greenhouse gases and empirically determined indirect aerosol effects, among other forcings, we have included all known substantial forcings. Precise analysis of the planetary energy imbalance provides a remarkable tool for "seeing the forest for the trees" with regard to global climate change. As the record lengthens, the energy imbalance will provide an invaluable metric defining the task that humanity faces if it wishes to stabilize global climate.

References (additional to those of Pielke and Christy)

J. Hansen *et al.*, *J. Geophys. Res.* **102**, 25679 (1997).
J. Hansen *et al.*, *J. Geophys. Res.* in press (2005).