We describe an empirical model of global climate based on multiple linear regression of observed global surface temperature, considering variations in radiative forcing due to GHGs, tropospheric aerosols, the solar cycle, ENSO, volcanic aerosols, the strength of the Atlantic Meridional Overturning Circulation (AMOC), and ocean heat export. We use this model to infer the strength of climate feedback that is consistent with the observed temperature anomaly over the past century, for a given value of net anthropogenic aerosols radiative forcing. The model is then used to project future warming due to rising levels of GHGs, assuming the empirically determined climate feedback persists. Our results suggest the CMIP5 models used in IPCC (2013) may over-estimate the future warming that will actually occur, especially if the strength of climate feedback inferred from the past is assumed to persist into the future.