

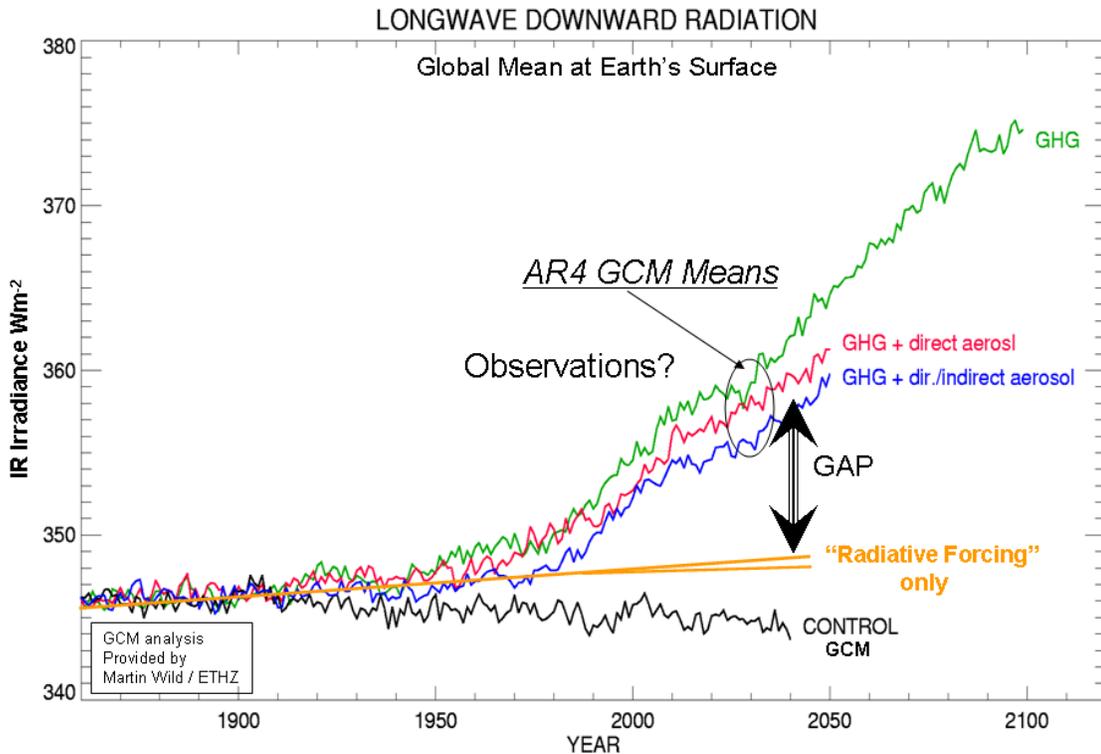
# Observationally Closing the Gap Between Climate Radiative Forcing and Changes in Radiation Climate

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The collective radiative forcing of climate from a number of sources as shown in the IPCC reports is a few (2-4)  $W m^{-2}$  over the period of time that  $CO_2$  is expected to double. However, the resulting actual change in radiation predicted by the ensemble of IPCC climate models over same time is 15-20  $W m^{-2}$ . While the radiative forcing is well-known, being supported by high-quality observations; to date, the larger actual radiation change is only predicted and largely dependent on assumed water vapor feedback. Nonetheless, the expected effects on global temperature have been given a high degree of certainty for currently being detected. Observational confirmation of the actual change in radiation climate along with its spatial variations would contribute to solidifying confidence in predicted climate scenarios as well as allowing better tracking of, and potentially improvements to, those predictions. For the past 15 years, we have been measuring infrared components of the surface radiation budget at a number of globally remote background sites. These data have been analyzed for temporal changes that may be related to model predicted changes. The results are beginning to show observational evidence for a closure of this gap. Details of the observational program and analysis will be presented as well as the preliminary results as summarized in the figure below.



**Figure 1.** Global mean downwelling thermal IR irradiance as function of time as predicted by the mean of the IPCC AR4 models and that due only to demonstrated radiative forcing with the gap between the two indicated.