

When global climate change models incorporate the effects of increased concentrations of greenhouse gas pollution, aerosols and cyclic changes in the sun’s output, the models most closely recreate the past climate history and give us most confidence in future estimates. While all three components play a role in our climate, greenhouse gases are now the major determinant.

Figure 7

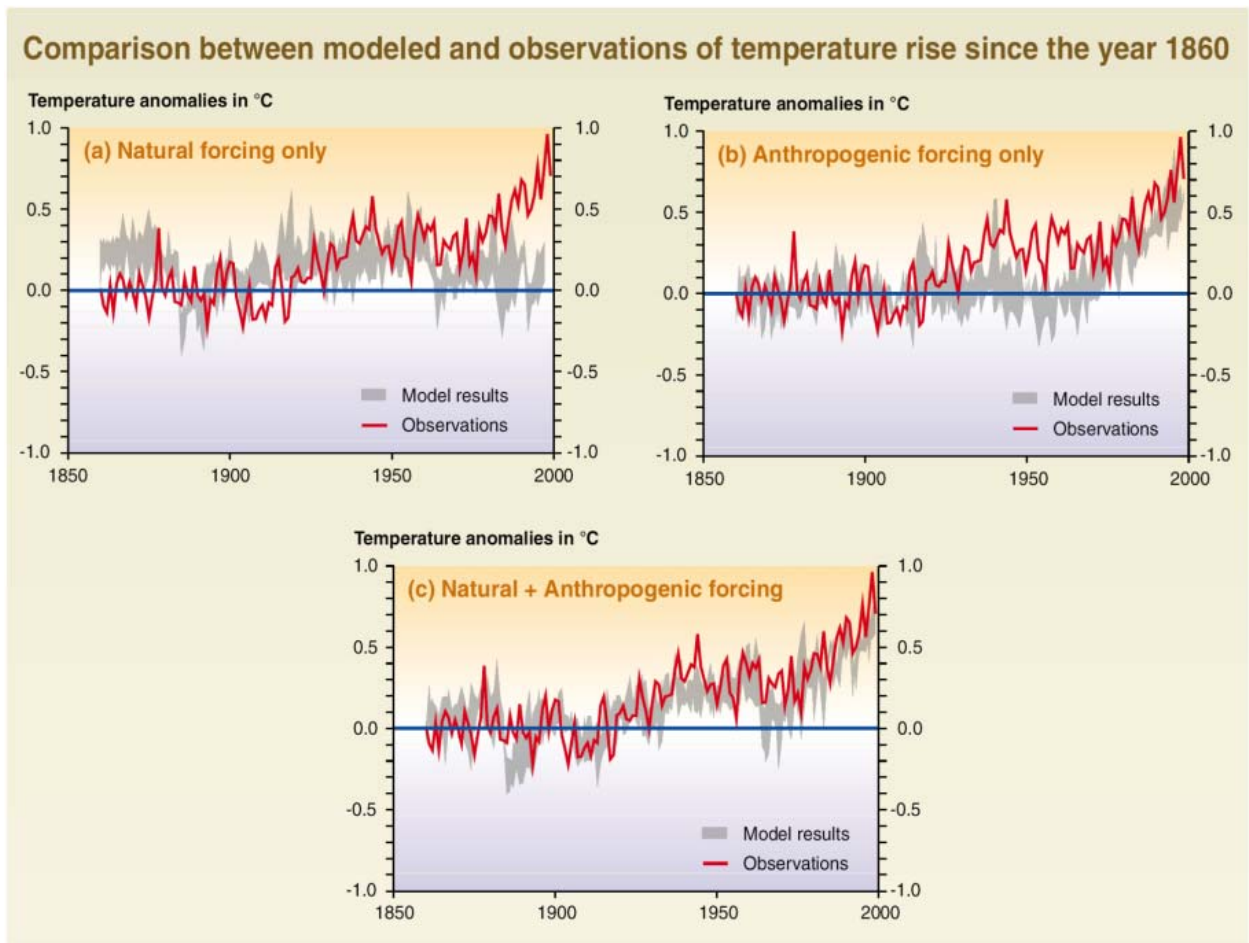


Figure SPM-2: Simulating the Earth’s temperature variations (°C) and comparing the results to the measured changes can provide insight to the underlying causes of the major changes. A climate model can be used to simulate the temperature changes that occur from both natural and anthropogenic causes. The simulations represented in the band in (a) were done with only natural forcings: solar variation and volcanic activity. Those encompassed by the band in (b) were done with anthropogenic forcings: greenhouse gases and an estimate of sulfate aerosols. And those encompassed by the band in (c) were done with both natural and anthropogenic forcings included. From (b), it can be seen that the inclusion of anthropogenic forcings provides a plausible explanation for a substantial part of the observed temperature changes over the past century, but the best match with observations is obtained in (c) when both natural and anthropogenic factors are included. These results show that the forcings included are sufficient to explain the observed changes, but do not exclude the possibility that other forcings may also have contributed.

Figure 7 above demonstrates the relationship between natural and anthropogenic (human-generated) sources of climate variation. Credible forecasts require modeling both sources of variation. In the period after 1960, most of the modeled variation is man-made, rather than natural. The combined model (c) using both sources of variation closely tracks observed climate changes.

Source: The Third Assessment Report of the Intergovernmental Panel on Climate Change, “Climate Change 2001: The Synthesis Report, Summary for Policymakers,” p.7.