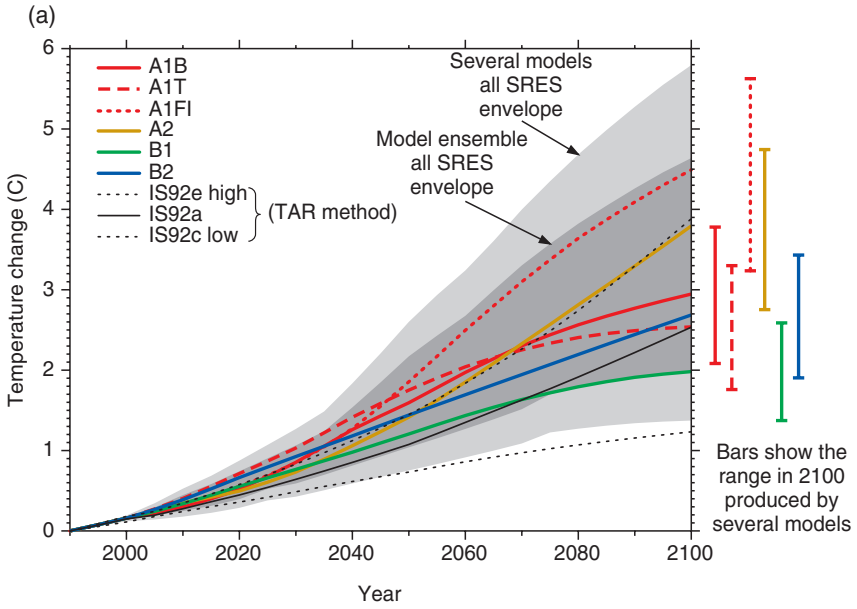

FIGURE 13.5. Mean global temperature change in 21st century.

and acting to offset some of the greenhouse-related warming. Sulphate aerosols are also responsible for the smaller *differences* in projected temperature increases between the SRES scenarios for the next 50 years or so depicted in Figure 13.5. In fossil fuel intensive scenarios (e.g. A1FI and A2) the rise in greenhouse gases is also accompanied by an increase in sulphate emissions (the greenhouse warming is therefore partly offset). Conversely, in scenarios where emissions of atmospheric pollutants decrease, lower levels of greenhouse gases are matched by lower levels of sulphur emissions (and the offsetting is lower). The net temperature changes in the near-term therefore are broadly similar. It is not until the second half of the 21st century that the longer-lived greenhouse gases such as CO_2 dominate over the sulphur emissions and the temperature responses diverge (IPCC, 2001).

5.2 *Precipitation*

As with temperature, *globally-averaged* precipitation is projected to rise during the 21st century. The precipitation increase can be directly linked to the rise in temperature. Not only do evaporation rates increase under warmer conditions, but a warmer atmosphere is also able to hold more moisture. The IPPC (2001) also indicate that increased levels of precipitation will be accompanied by a simultaneous increase in precipitation variability; although on average more rainfall will fall this may be delivered by short, intense outbursts leaving other periods prone to drought.

The average global precipitation response under the IPCC A2 scenario for the final 30 years of the 21st century is 3.9%, compared to mean 1961–1990 conditions, with a range of 1.3 to 6.8%. The B2 scenario, having a lower anthropogenic forcing, responds with a lower increase of precipitation, 3.3%, with a range of 1.2 to 6.1% for the same time period (IPCC, 2001). Accompanying the trend towards a wetter planet, there is evidence to suggest that the additional precipitation will be delivered by more intense precipitation events (IPCC, 2001).

5.3 Sea level rise

The range of projected globally-averaged sea level rise in the 21st century is large, lying between 0.09 and 0.88 m for the full set of SRES scenarios according to the IPCC (Figure 13.6). The mean increase by the year 2100 is 0.48 m which represents a two to four increase in the rate of sea level rise which was recorded in the 20th century. The amount of sea level rise experienced in each scenario differs only slightly in the first half of the 21st century (for those same reasons outlined in Section 5.1). Greater inter-scenario differences can be seen in the years after 2060, with larger rises in sea levels associated with the fossil-fuel intensive scenarios.

The majority of the projected sea level rise is due to thermal expansion of the oceans as the planet becomes warmer. Additional sea level rise is caused

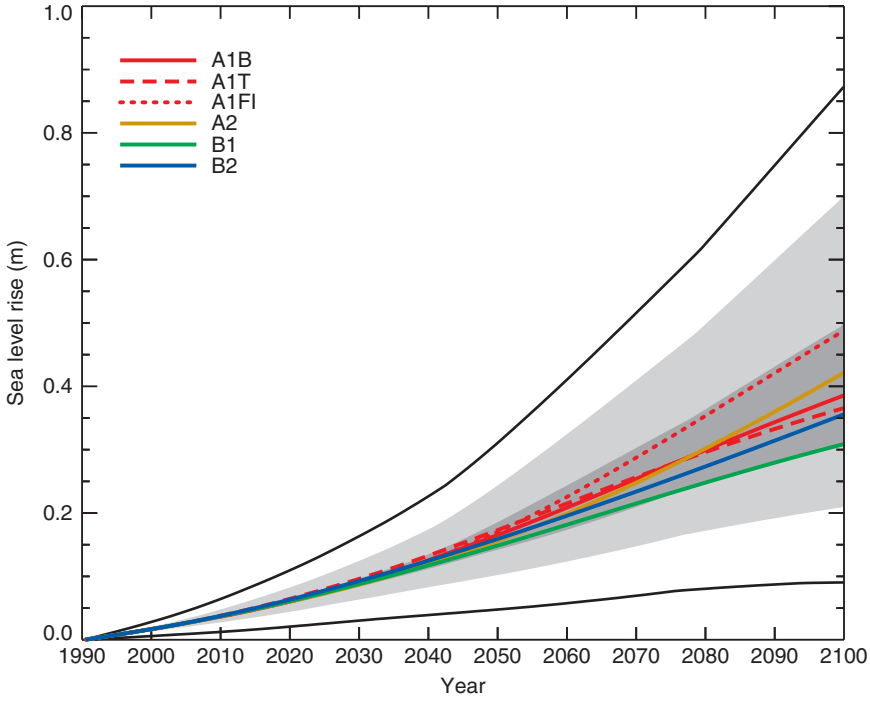

FIGURE 13.6. Sea level rise for each scenario.

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