

5.3.14 Shanghai

The GHG emissions of Shanghai was 29 MtCO₂e in 1975, that escalated to 77 MtCO₂e in 1990 and 596 MtCO₂e in 2015. A significant proportion of the GHG emissions in 2015 (Figure 5.40, top) were contributed by the industry sector (82%), followed by the energy sector (12%). On the other hand, the emissions from transport sector (3%), residential sector (3%) and agricultural sector (~0%) were miniscule. As per the ICLAP model estimates (Figure 5.40, below), there would be an increase in emissions at 7.9% per annum, leading to 709 MtCO₂e in 2030 and 957 MtCO₂e in 2050.

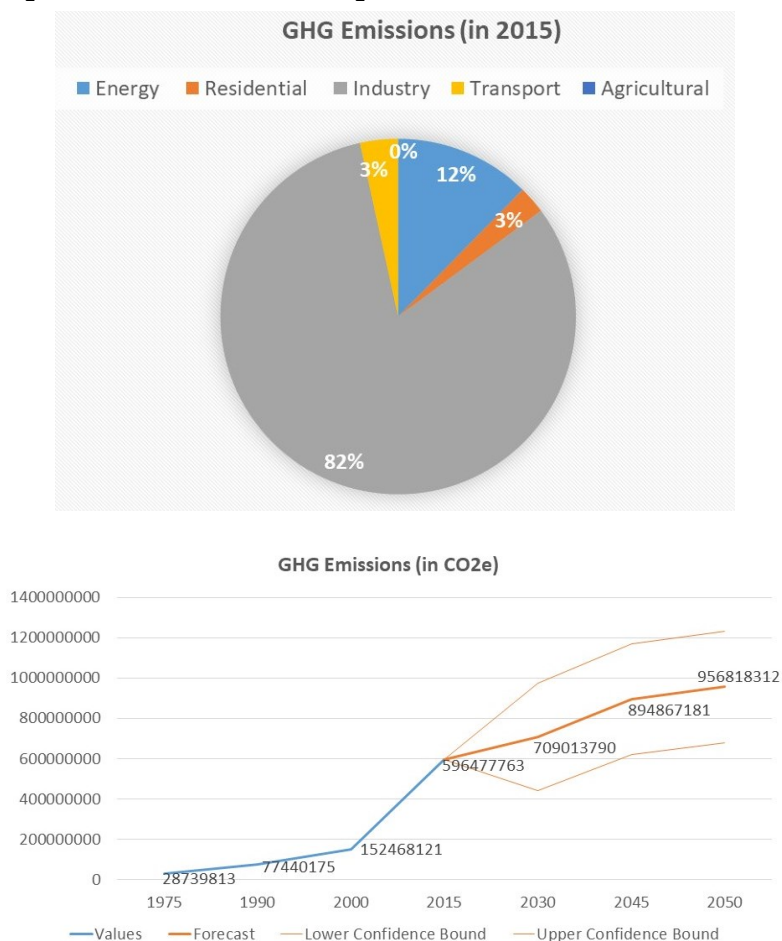


Figure 5.40: GHG contributions from different sectors in Shanghai (top); ICLAP model estimates for Shanghai's GHG emissions till 2050 (bottom)

The results for climate variability in Shanghai indicate that depending on the emission scenarios, there would be a temperature increase of 1.3–3.8 degC from 2030 to 2080s (Figure 5.41, top). The scenario corresponding to the pathway with moderate GHGs (SSP245_MIROC6) exhibits an increase of 1.3 degC during 2030s (above the 1980 baseline temperature), 1.7 degC in 2050s, peaking to 2.2 degC during 2080s. The spatial results for moderate scenario over 2010-80s are mapped in Figure 5.41 (middle). Meanwhile, the scenario corresponding to the pathway with the highest GHGs (SSP585_MIROC6) exhibits an increase of 1.5 degC during 2030s (above the 1980 baseline temperature), 2.6 degC in 2050s further rising sharply to 3.6 degC above normal up to 2080s. The spatial results for high emission scenario over 2010-80s are mapped in Figure 5.41 (bottom). Meanwhile, the precipitation change for Shanghai shows a very high variability in the long run, up to 200 mm above the normal (Figure 5.42, top) depending on the emission scenarios. The scenario

corresponding to the pathway with moderate GHGs (SSP245_MIROC6) exhibits an increase of over 80 mm during 2030s (above the 1980 baseline rainfall), plateauing to 100 mm in 2050s. The rainfall is expected to decline gradually to near normal situation during 2070s and re-escalating to 90 mm above the 1980 baseline during 2080s. The spatial results for moderate scenario over 2010-80s are mapped in Figure 5.42 (middle). Meanwhile, the scenario corresponding to the pathway with the highest GHGs (SSP585_MIROC6) shows Shanghai's city rainfall to be around 20 mm (above the 1980 baseline rainfall) during 2030s, 125 mm in 2050s, declining to 80 mm in 2060s, and re-escalating to 200 mm in 2080s. The spatial results for high emission scenario over 2010-80s are mapped in Figure 5.42 (bottom).

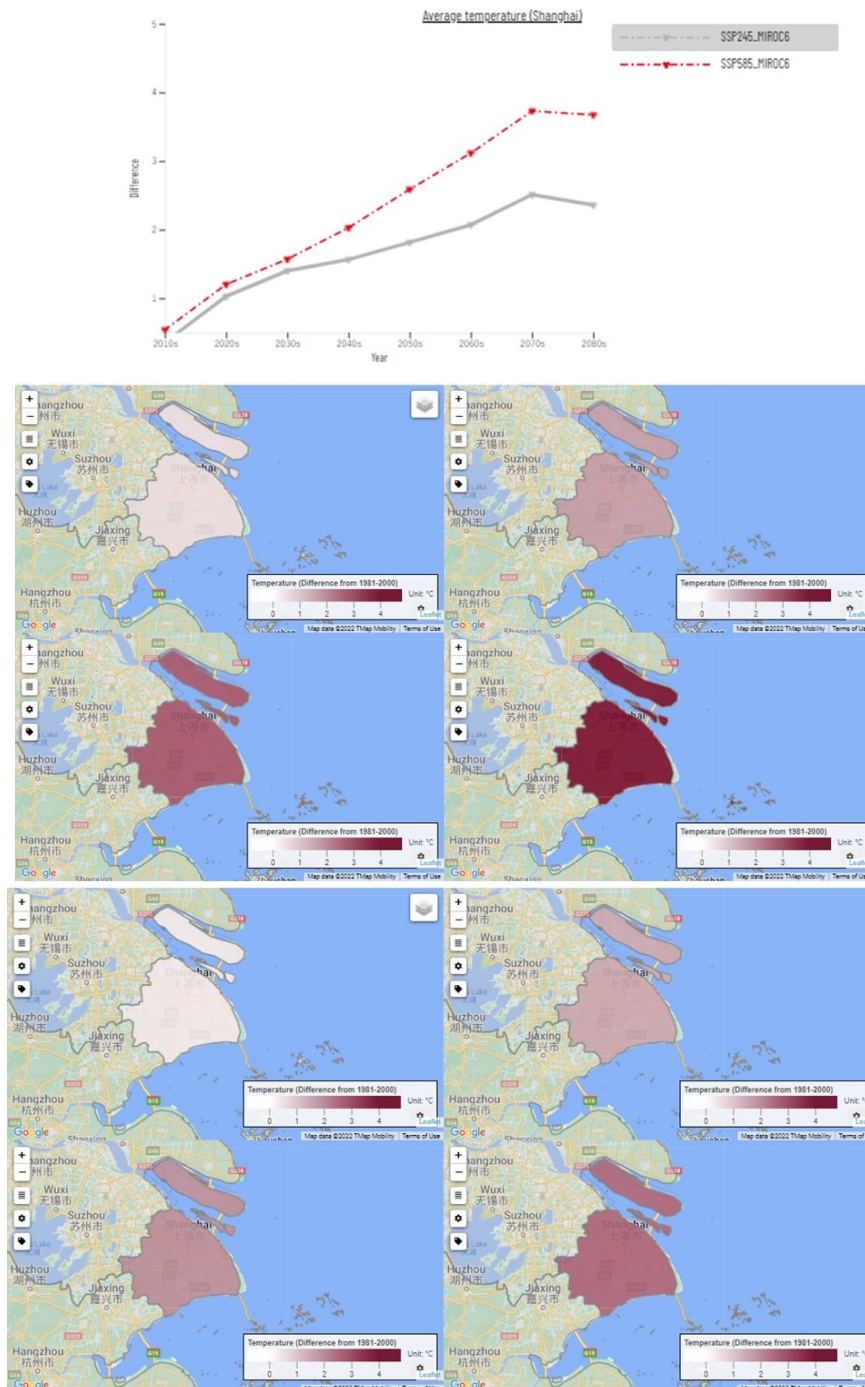


Figure 5.41: Temperature increase in Shanghai under medium (grey) and high (red) emission scenario till 2080s (top); Spatial results for medium scenario for 2010s, 2030s, 2050s, 2080s (middle); Spatial results for high scenario for 2020s, 2030s, 2050s, 2080s (bottom)

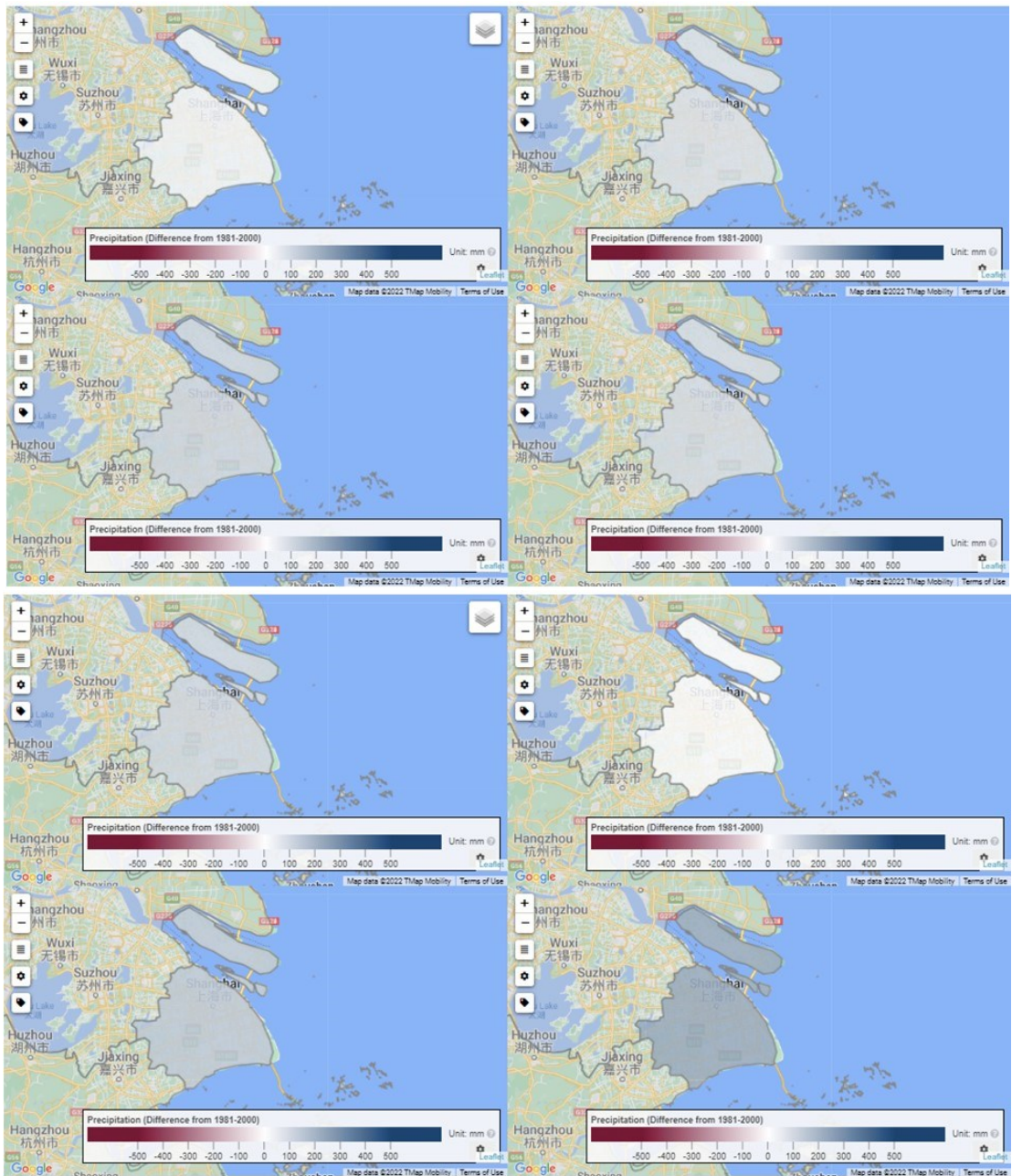
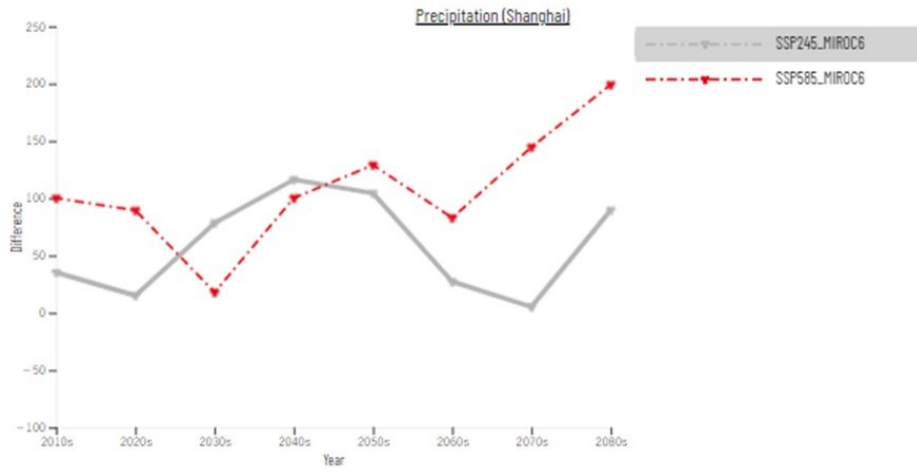


Figure 5.42: Precipitation variation in Shanghai under medium (grey) and high (red) emission scenario till 2080s (top); Spatial results for medium scenario for 2010s, 2030s, 2050s, 2080s (middle); Spatial results for high scenario for 2020s, 2030s, 2050s, 2080s (bottom)