

5.3.15 Shenyang

The GHG emission of Shenyang was 2.5 MtCO₂e in 1975, that escalated to 4.3 MtCO₂e in 1990 and 16.6 MtCO₂e in 2015. A majority of the GHG emissions in 2015 (Figure 5.43, top) were contributed by the industry sector (39%) and energy sector (38%), followed by residential sector (12%) and transport sector (11%). As per the ICLAP model estimates (Figure 5.43, below), there would be an increase in emissions at 4.8% per annum, leading to 19.5 MtCO₂e in 2030 and 25.6 MtCO₂e in 2050.

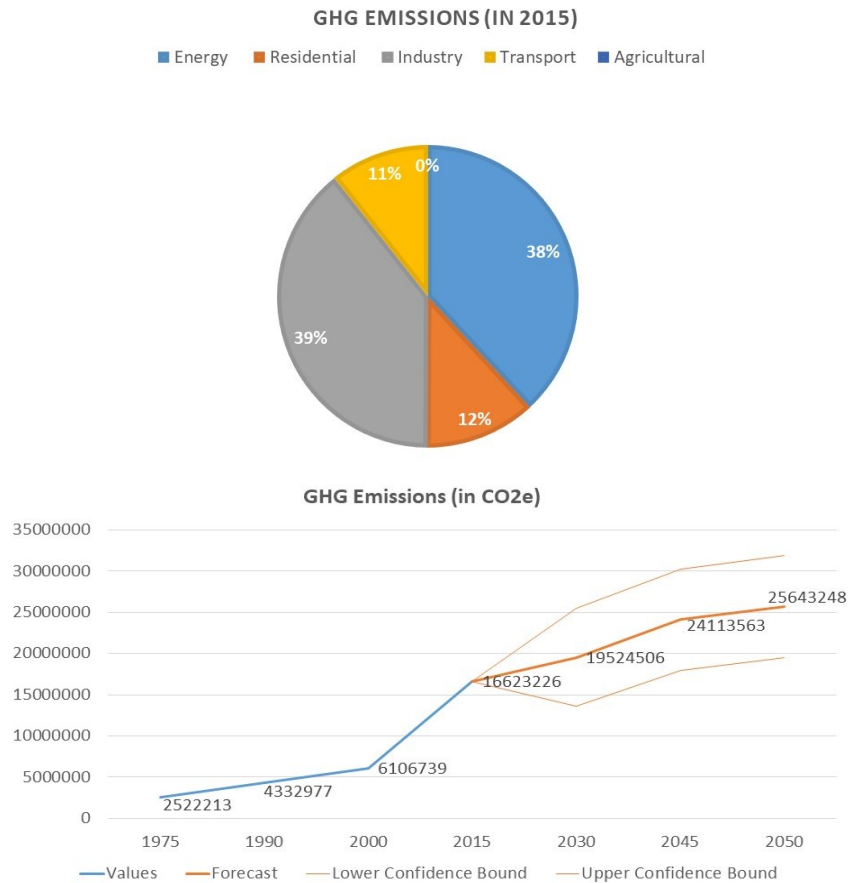


Figure 5.43: GHG contributions from different sectors in Shenyang (top); ICLAP model estimates for Shenyang's GHG emissions till 2050 (bottom)

The results for climate variability in Shenyang indicate that depending on the emission scenarios, there would be a temperature increase of 1.8–5.2 degC from 2030–80s (Figure 5.44, top). The scenario corresponding to the pathway with moderate GHGs (SSP245_MIROC6) exhibits an increase of 1.8 degC in 2030s (above the 1980 baseline temperature), 2.4 degC in 2050s, peaking to 2.6 degC in 2080s. The spatial results for moderate scenario over 2010–80s are mapped in Figure 5.44 (middle). Meanwhile, the scenario corresponding to the pathway with the highest GHGs (SSP585_MIROC6) exhibits an increase of 2.4 degC in 2030s (above the 1980 baseline temperature), 3.2 degC in 2050s further rising sharply to 5.2 degC above normal up to 2080s. The spatial results for high emission scenario over 2010–80s are mapped in Figure 5.44 (bottom). Meanwhile, the precipitation change for Shenyang shows high variability in the long run, ranging from -20 to 200 mm from the normal (Figure 5.45, top) depending on the emission scenarios. The scenario corresponding to the pathway with moderate GHGs (SSP245_MIROC6) exhibits an increase of about 130 mm in 2030s (above the 1980 baseline rainfall), declining to 20

mm in 2050s, rising to 185 mm in 2070s and declining again to 140 mm in 2080s. The spatial results for moderate scenario over 2010-80s are mapped in Figure 5.45 (middle). Meanwhile, the scenario corresponding to the pathway with the highest GHGs (SSP585_MIROC6) shows Shenyang's city rainfall hover around -20 mm (above the 1980 baseline rainfall) in 2030s, rising up to 130 mm in 2050s, rising again to 200 mm in 2070s, declining to about 165 mm in 2080s. The spatial results for high emission scenario over 2010-80s are mapped in Figure 5.45 (bottom).

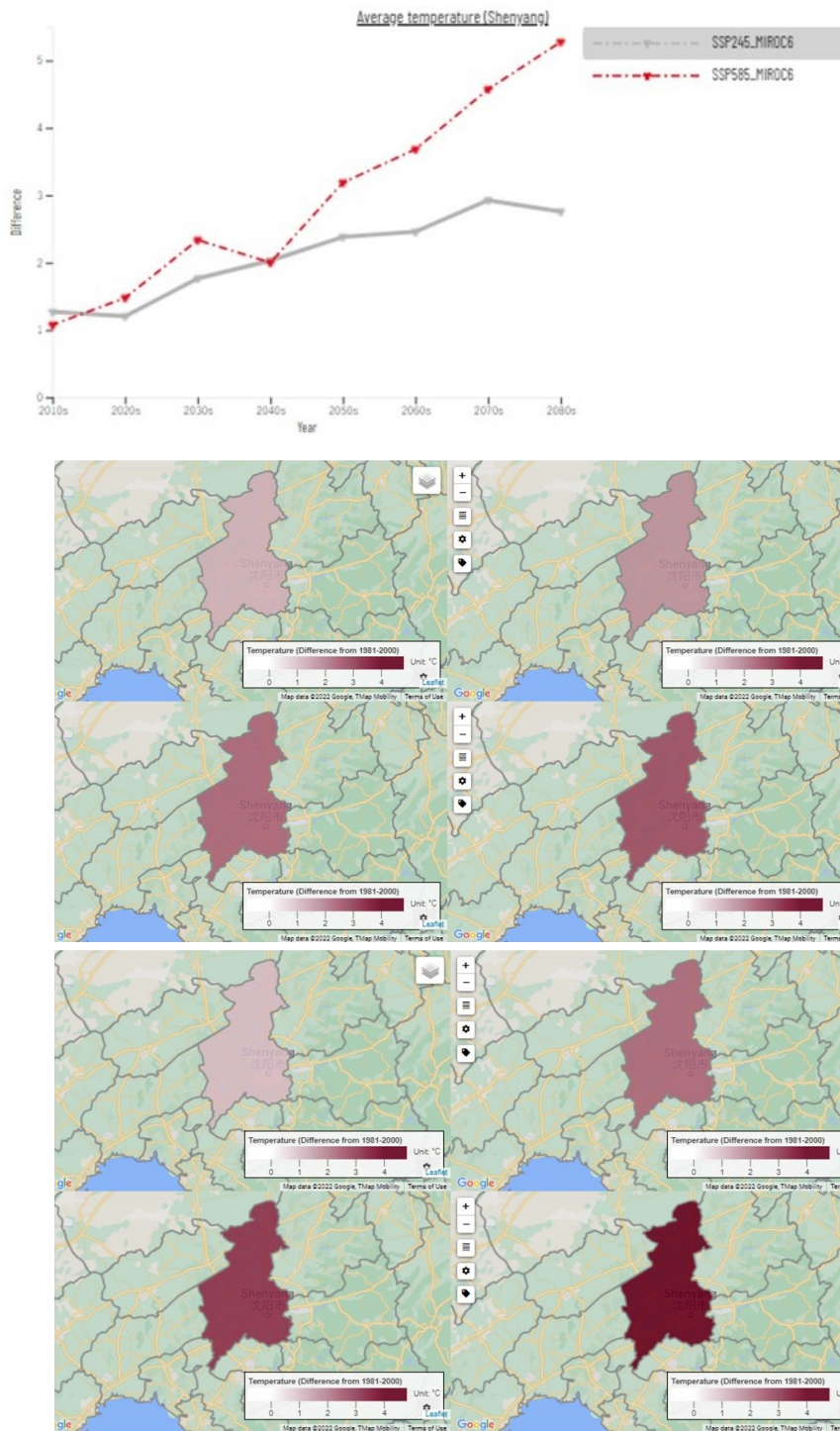


Figure 5.44: Temperature increase in Shenyang under medium (grey) and high (red) emission scenario till 2080s (top); Spatial results for medium scenario for 2010s, 2030s, 2050s, 2080s (middle); Spatial results for high scenario for 2020s, 2030s, 2050s, 2080s (bottom)

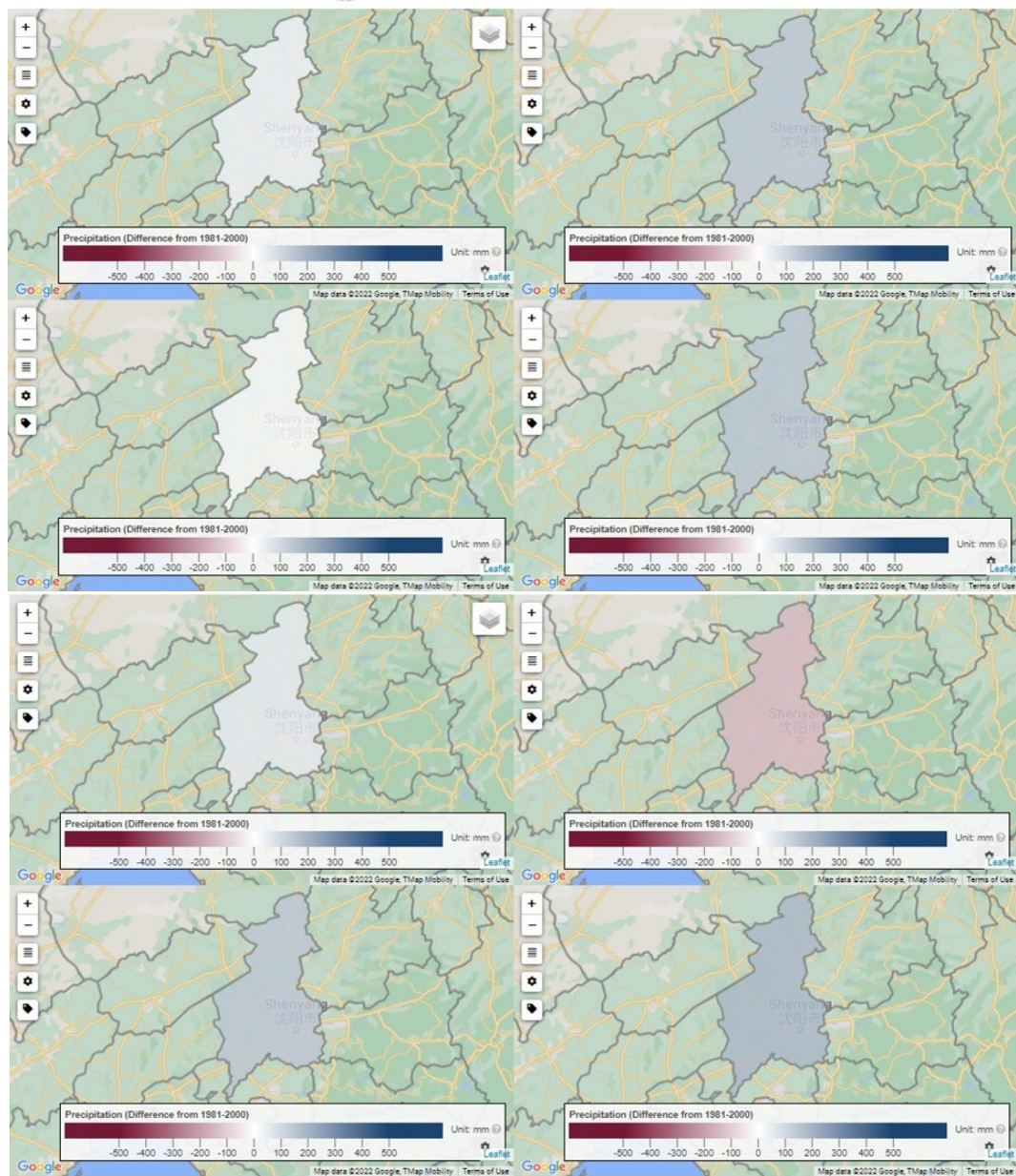
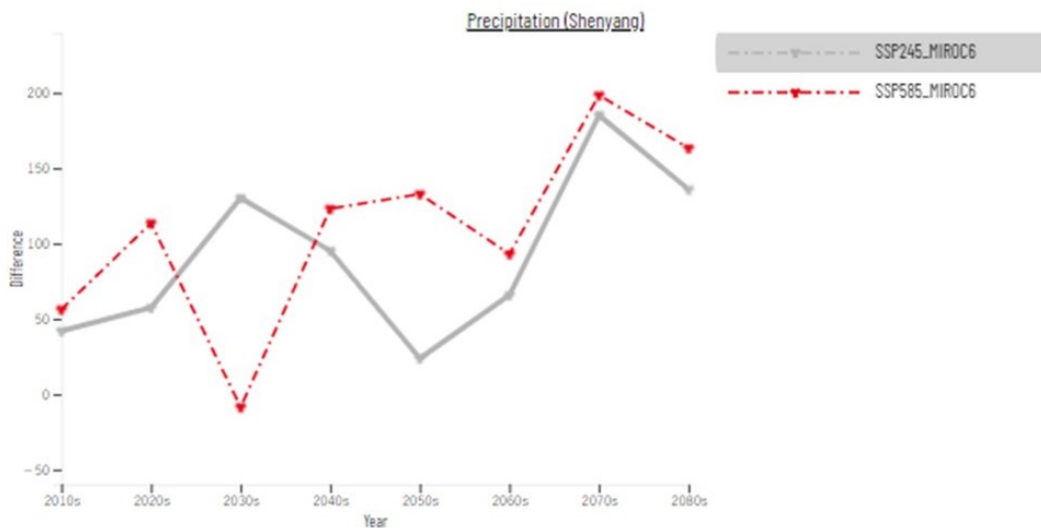


Figure 5.45: Precipitation variation in Shenyang under medium (grey) and high (red) emission scenario till 2080s (top); Spatial results for medium scenario for 2010s, 2030s, 2050s, 2080s (middle); Spatial results for high scenario for 2020s, 2030s, 2050s, 2080s (bottom)