

5.3.4 Dalian

The GHG emissions of Dalian was 2.1 MtCO₂e in 1975, that escalated to 6.1 MtCO₂e in 1990 and 32.2 MtCO₂e in 2015. A majority of the GHG emissions in 2015 (Figure 5.10, top) were contributed by the industry sector (52%) and energy sector (41%), followed by transport sector (4%) and residential sector (3%). As per the ICLAP model estimates (Figure 5.10, below), there would be an increase in emissions at 7.0% per annum, leading to 38.6 MtCO₂e in 2030 and 51.7 MtCO₂e in 2050.

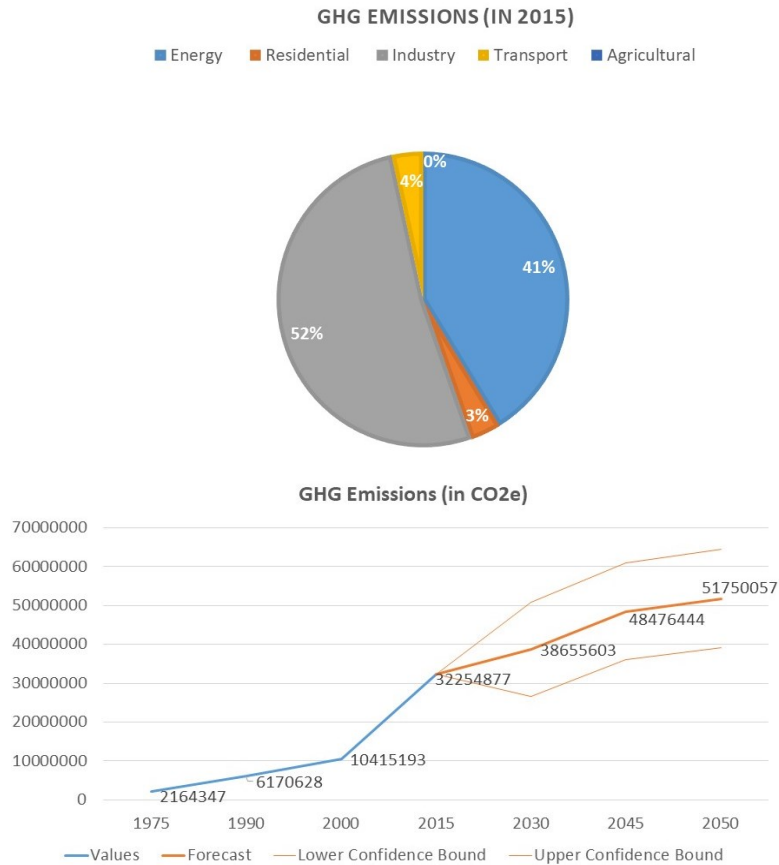


Figure 5.10: GHG contributions from different sectors in Dalian (top); ICLAP model estimates for Dalian's GHG emissions till 2050 (bottom)

The results for climate variability in Dalian indicate that depending on the emission scenarios, there would be a temperature increase of 1.6–4.9 degC from 2030-80s (Figure 5.11, top). The scenario corresponding to the pathway with moderate GHGs (SSP245_MIROC6) exhibits an increase of 1.7 degC during 2030s (above the 1980 baseline temperature), 2.1 degC in 2050s, peaking to 2.5 degC during 2080s. The spatial results for moderate scenario over 2010-80s are mapped in Figure 5.11 (middle). Meanwhile, the scenario corresponding to the pathway with the highest GHGs (SSP585_MIROC6) exhibits an increase of 2 degC during 2030s (above the 1980 baseline temperature), 2.9 degC in 2050s further rising sharply to 4.9 degC above normal up to 2080s. The spatial results for high emission scenario over 2010-80s are mapped in Figure 5.11 (bottom). Meanwhile, the precipitation change for Dalian shows a very high variability in the long run, ranging from 40 to 190 mm from the normal (Figure 5.12, top) depending on the emission scenarios. The scenario corresponding to the pathway with moderate GHGs (SSP245_MIROC6) exhibits an increase of about 135 mm during 2030s (above the 1980 baseline rainfall), dipping to 98 mm in 2050s, rising again to 200 mm during 2070s and dipping to 189 mm during 2080s. The spatial results for moderate scenario over

2010-80s are mapped in Figure 5.12 (middle). Meanwhile, the scenario corresponding to the pathway with the highest GHGs (SSP585_MIROC6) shows Dalian's city rainfall increase to around 40 mm (above the 1980 baseline rainfall) during 2030s, rising up to 178 mm in 2050s, declining to 168 mm in 2060s, rising to about 190 mm in 2080s. The spatial results for high emission scenario over 2010-80s are mapped in Figure 5.12 (bottom).

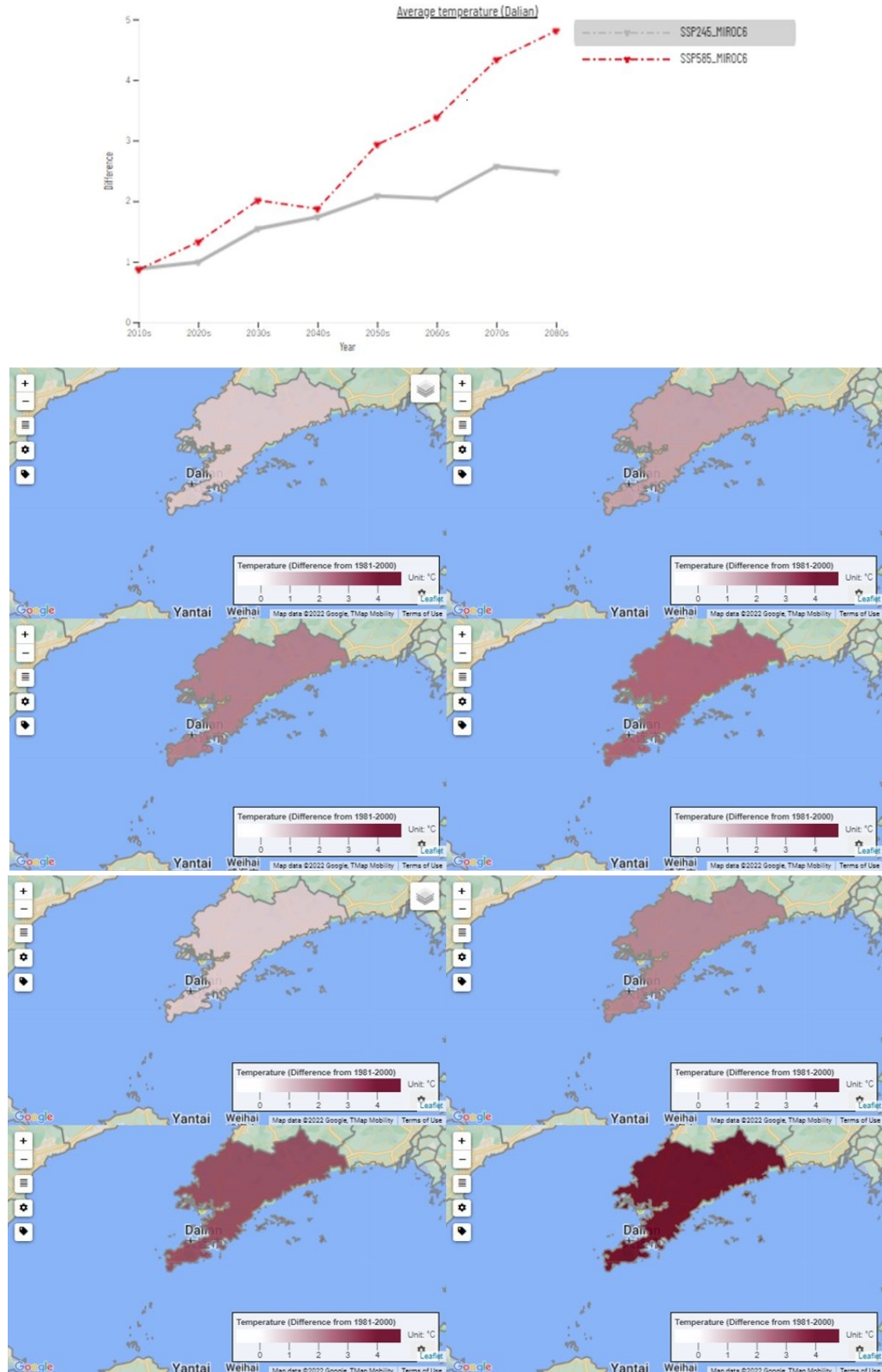


Figure 5.11: Temperature increase in Dalian under medium (grey) and high (red) emission scenario till 2080s (top); Spatial results for medium scenario for 2010s, 2030s, 2050s, 2080s (middle); Spatial results for high scenario for 2020s, 2030s, 2050s, 2080s (bottom)

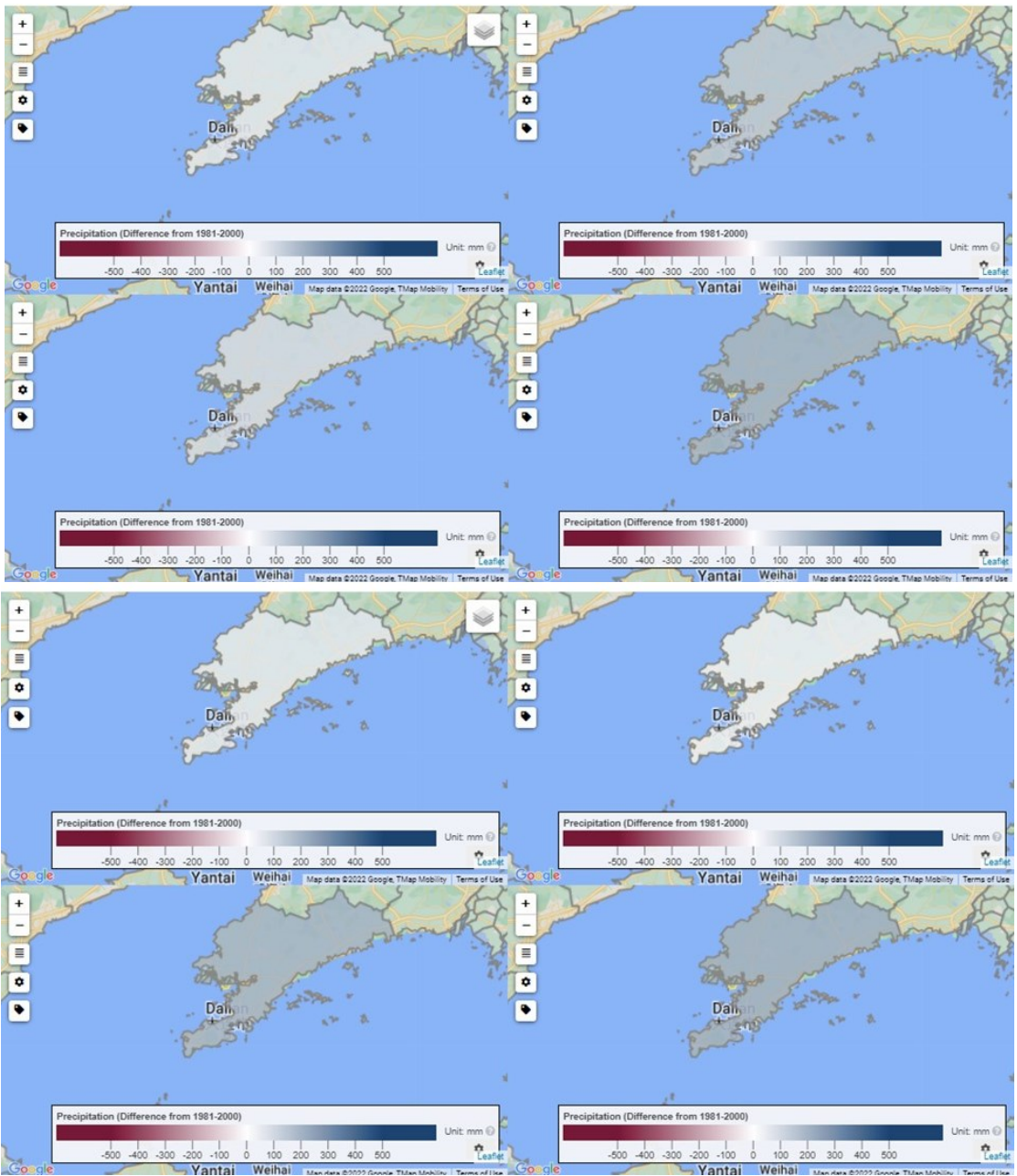
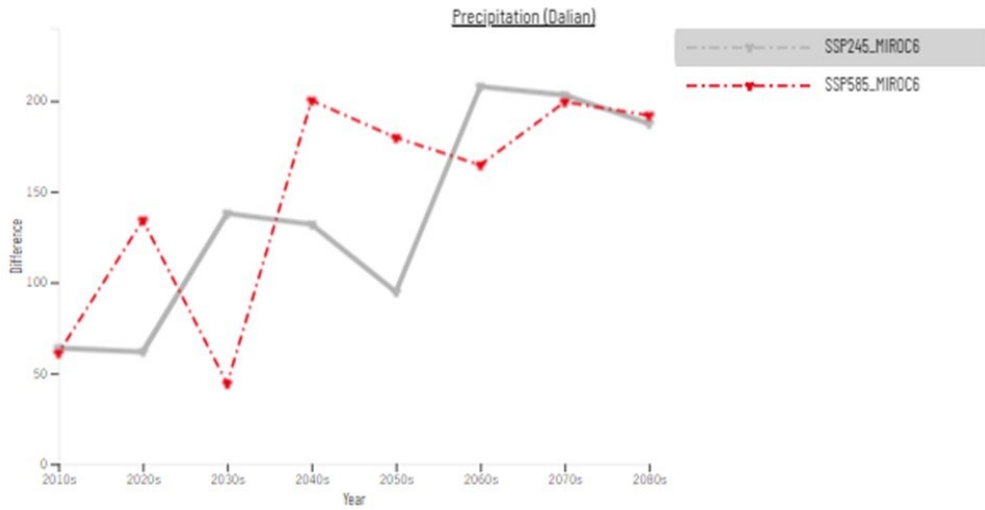


Figure 5.12: Precipitation variation in Dalian under medium (grey) and high (red) emission scenario till 2080s (top); Spatial results for medium scenario for 2010s, 2030s, 2050s, 2080s (middle); Spatial results for high scenario for 2020s, 2030s, 2050s, 2080s (bottom)