5.3.16 Shenzhen

The GHG emissions of Shenzhen was 25 $MtCO_2e$ in 1975, that escalated to 91 $MtCO_2e$ in 1990 and 258 $MtCO_2e$ in 2015. A significant proportion of the GHG emissions in 2015 (Figure 5.46, top) were contributed by the energy sector (46%), followed by the industry sector (35%). Meanwhile, the emissions from transport sector (10%), residential sector (9%) and agricultural sector (~0%) were marginal. As per the ICLAP model estimates (Figure 5.46, below), there would be an increase in emissions at 6% per annum, leading to about 309 $MtCO_2e$ in 2030 and 411 $MtCO_2e$ approximately in 2050.

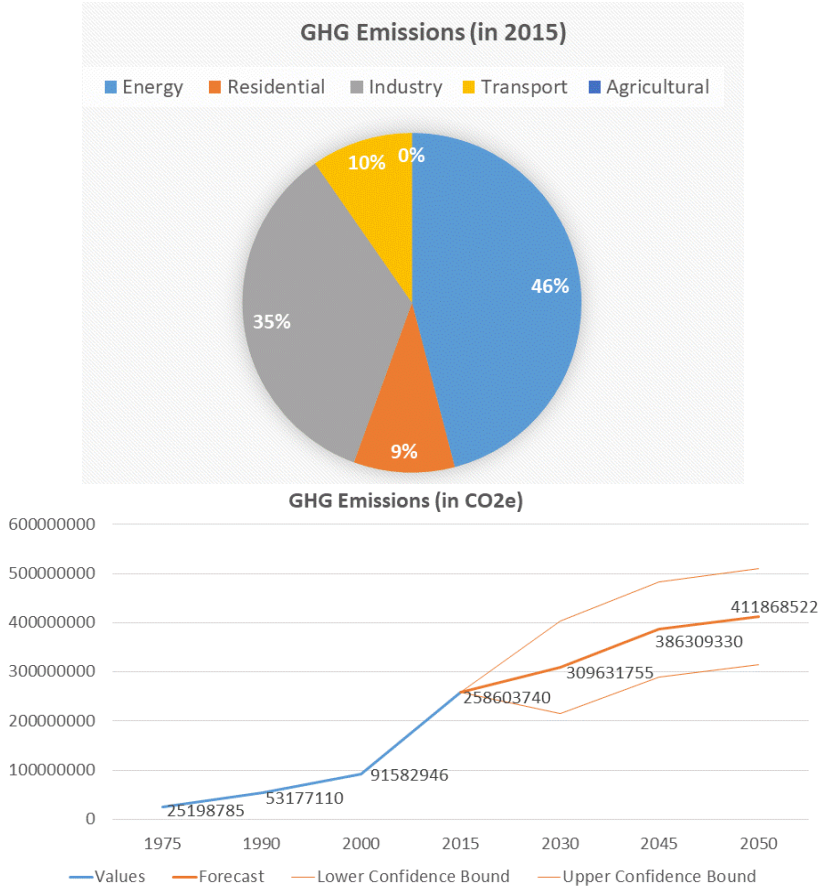

Figure 5.46: GHG contributions from different sectors in Shenzhen (top); ICLAP model estimates for Tianjin's GHG emissions till 2050 (bottom)

The results for climate variability in Shenzhen indicate that depending on the emission scenarios, there would be a temperature increase of 1–4 degC from 2030 to 2080s (Figure 5.47, top). The scenario corresponding to the pathway with moderate GHGs (SSP245_MIROC6) exhibits an increase of 1 degC during 2030s (above the 1980 baseline temperature), 1.5 degC in 2050s, peaking to 2 degC during 2080s. The spatial results for moderate scenario over 2010-80s are mapped in Figure 5.47 (middle). Meanwhile, the scenario corresponding to the pathway with the highest GHGs (SSP585_MIROC6) exhibits an increase of 1 degC during 2030s (above the 1980 baseline temperature), 2 degC in 2050s further rising sharply to 4 degC above normal up to 2080s. The spatial results for high emission scenario over 2010-80s are mapped in Figure 5.47 (bottom). Meanwhile, the precipitation change for Shenzhen shows a very high variability in the long run, ranging -225 mm to 150 mm from the normal (Figure 5.48, top) depending on the emission scenarios. The scenario corresponding to the pathway with moderate GHGs (SSP245_MIROC6) exhibits a decline of 100 mm during 2030s (from the 1980 baseline rainfall), rebounding to

near normal conditions in 2050s. The rainfall is expected to decline significantly to -225 mm (below the 1980 baseline) during 2070s, where after it re-escalates robustly to 150 mm above normal during 2080s. The spatial results for moderate scenario over 2010-80s are mapped in Figure 5.48 (middle). Meanwhile, the scenario corresponding to the pathway with the highest GHGs (SSP585_MIROC6) shows Shenzhen's rainfall to be around -50 mm (from the 1980 baseline rainfall) during 2030s, continues to do so up to -125 mm during 2040s and rebounds to -35 mm in 2050s. The net increase of rainfall would be 40 mm in 2060s (above the normal), 100 mm in 2070s that stabilizes to 110 mm in 2080s. The spatial results for high emission scenario over 2010-80s are mapped in Figure 5.48 (bottom).

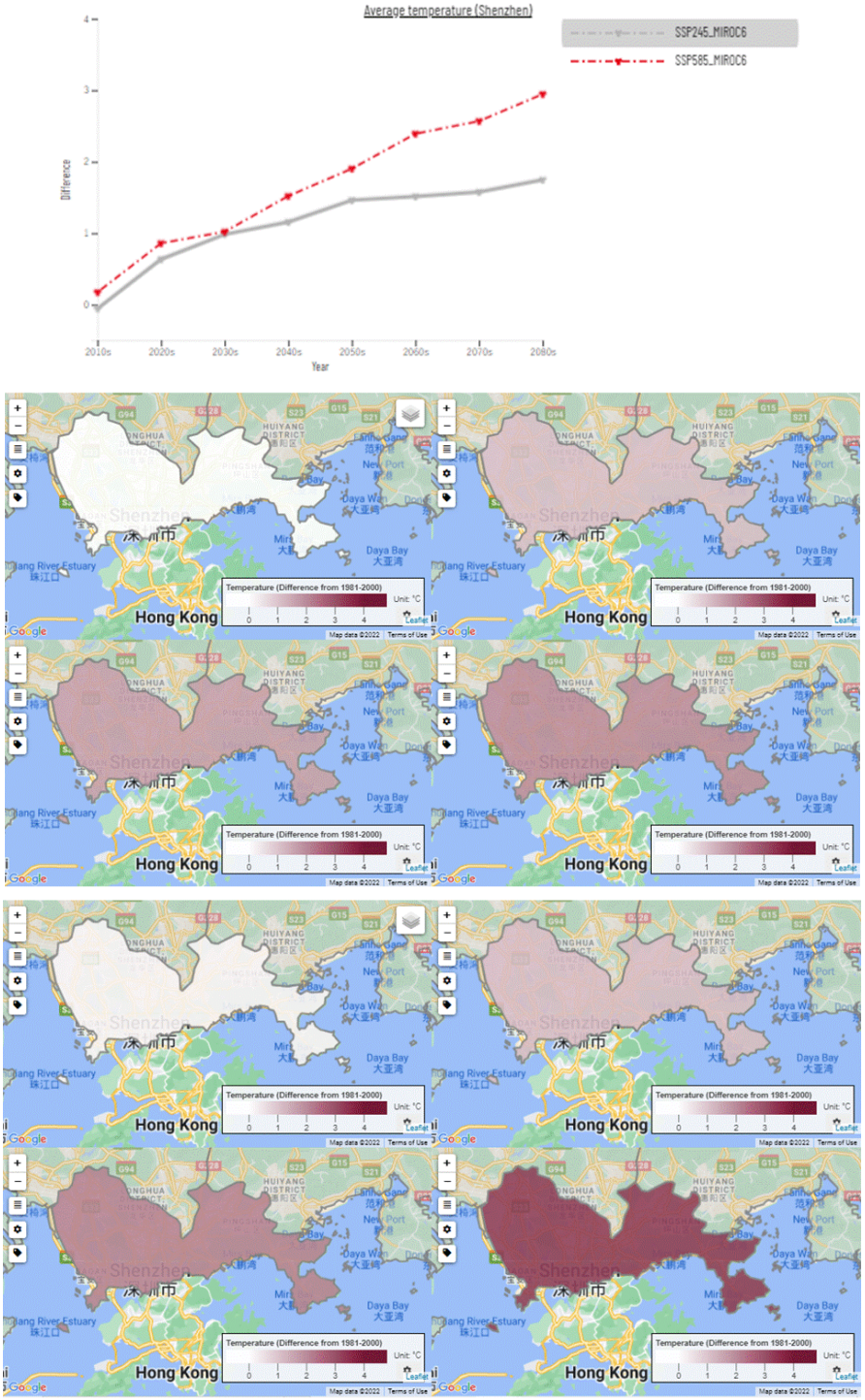

Figure 5.47: Temperature increase in Shenzhen under medium (grey) and high (red) emission scenario till 2080s (top); Spatial results for medium scenario for 2010s, 2030s, 2050s, 2080s (middle); Spatial results for high scenario for 2020s, 2030s, 2050s, 2080s (bottom)

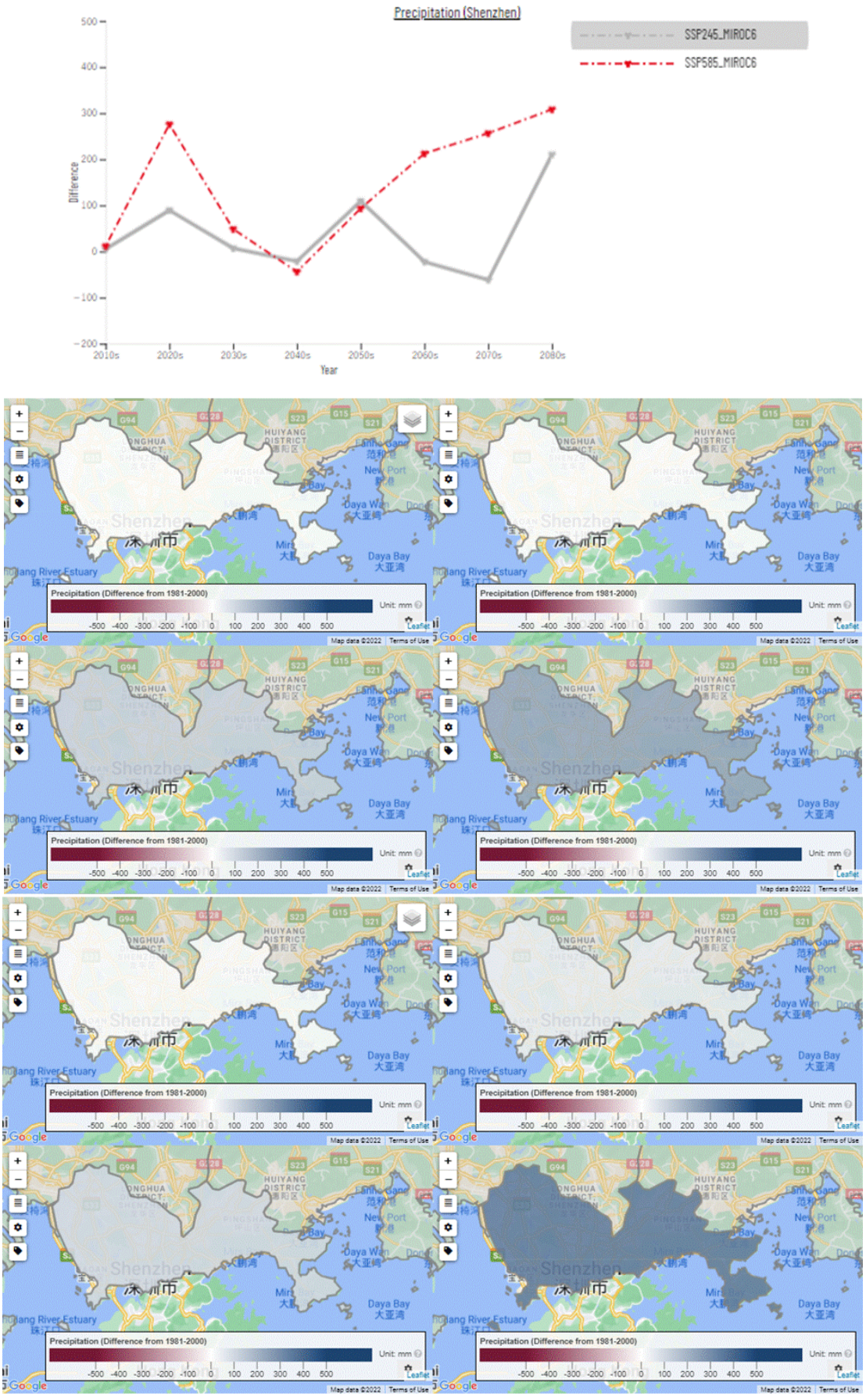

Figure 5.48: Precipitation variation in Shenzhen under medium (grey) and high (red) emission scenario till 2080s (top); Spatial results for medium scenario for 2010s, 2030s, 2050s, 2080s (middle); Spatial results for high scenario for 2020s, 2030s, 2050s, 2080s (bottom)