6.3.5 Kolkata

The GHG emissions of Kolkata was 5.2 $MtCO_2e$ in 1975, that escalated to 15.1 $MtCO_2e$ in 1990 and 32.8 $MtCO_2e$ in 2015. A majority of GHG emissions in 2015 (Figure 6.13, top) were contributed by energy sector (55%), followed by the industry sector (36%), residential sector (11%) and transport sector (7%). As per the ICLAP model estimates (Figure 6.13, bottom), there would be an increase in emissions at 4.7% per annum, leading to 43.4 $MtCO_2e$ in 2030 and 55.9 $MtCO_2e$ in 2050.

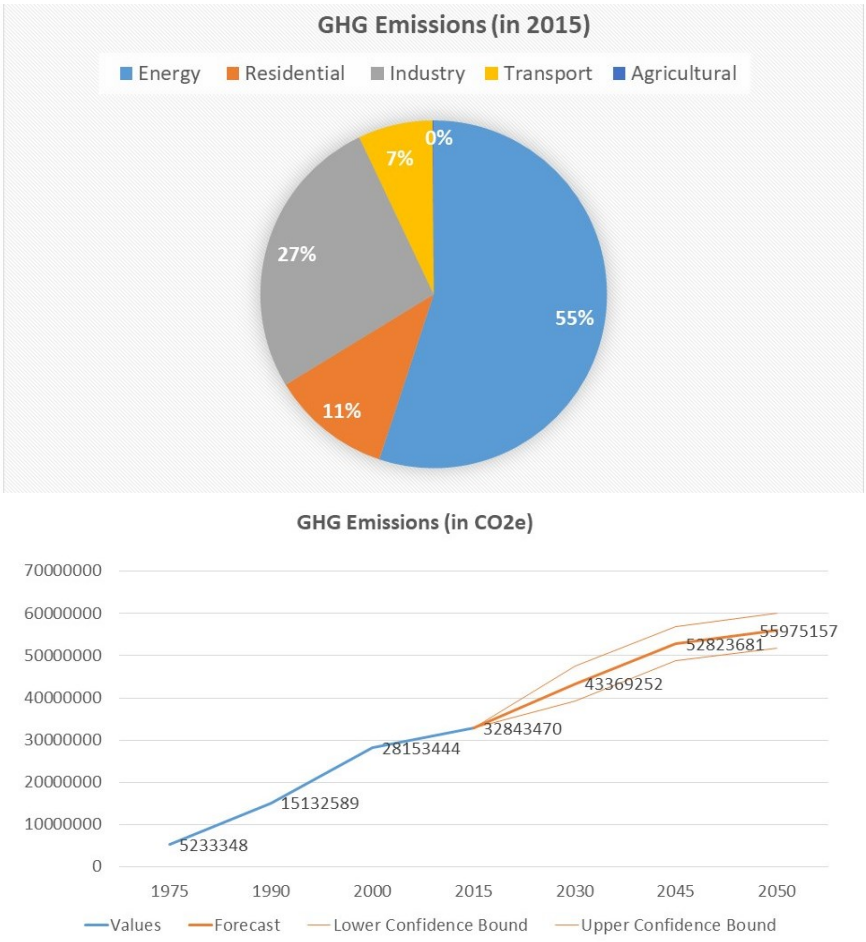

Figure 6.13: GHG contributions from different sectors in Kolkata (top); ICLAP model estimates for Kolkata's GHG emissions till 2050 (bottom)

The results for climate variability in Kolkata indicate that depending on the emission scenarios, there would be a temperature increase of 1.3–2.3 degC up till 2080s (Figure 6.14, top). The scenario corresponding to the pathway with moderate GHGs (SSP245_MIROC6) exhibits an increase of 0.4 degC during 2030s (above the 1980 baseline temperature), 0.8 degC in 2050s, rising gradually to over 1.3 degC during 2080s. The spatial results for moderate scenario over 2010-80s are mapped in Figure 6.14 (middle). Meanwhile, the scenario corresponding to the pathway with the highest GHGs (SSP585_MIROC6) exhibits an increase of 0.5 degC during 2030s (above the 1980 baseline temperature), 1.1 degC in 2050s and rising steeply to 2.3 degC above normal up to 2080s. The spatial results for high emission scenario over 2010-80s are mapped in Figure 6.14 (bottom). Meanwhile, the precipitation change for Kolkata shows high variability in the long run, ranging from a deviation of -50 to +480 mm from the normal (Figure 6.15 top) depending on the emission scenarios. The scenario corresponding to the pathway with moderate GHGs

(SSP245_MIROC6) exhibits an increase of 20 mm during 2030s (above the 1980 baseline rainfall) to 75 mm in 2050s, rising up to 280 mm in 2070s followed by a decline to 220 mm during 2080s. The spatial results for moderate scenario over 2010-80s are mapped in Figure 6.15 (middle). Meanwhile, the scenario corresponding to the pathway with the highest GHGs (SSP585_MIROC6) show a highly uncertain pattern, an abrupt increase of 420 mm (above the 1980 baseline rainfall) up to 2050s, falling to 150 mm in 2060s, re-escalating to about 480 mm in 2070s and thereafter sliding back to 385 mm in 2080s. The spatial results for high emission scenario over 2010-80s are mapped in Figure 6.15 (bottom).

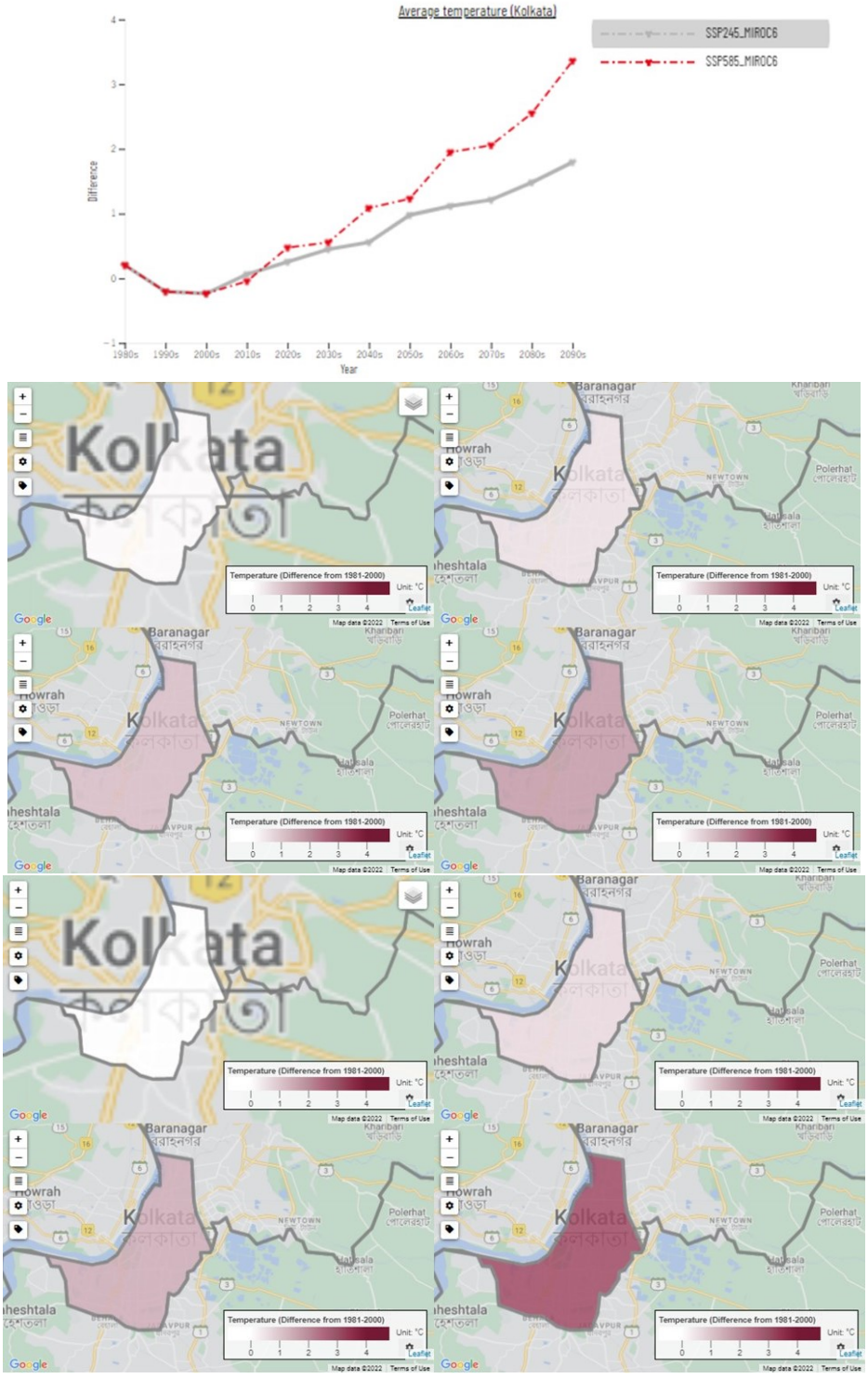

Figure 6.14: Temperature increase in Kolkata under medium (grey) and high (red) emission scenario till 2080s (top); Spatial results for medium scenario for 2010s, 2030s, 2050s, 2080s (middle); Spatial results for high scenario for 2020s, 2030s, 2050s, 2080s (bottom)

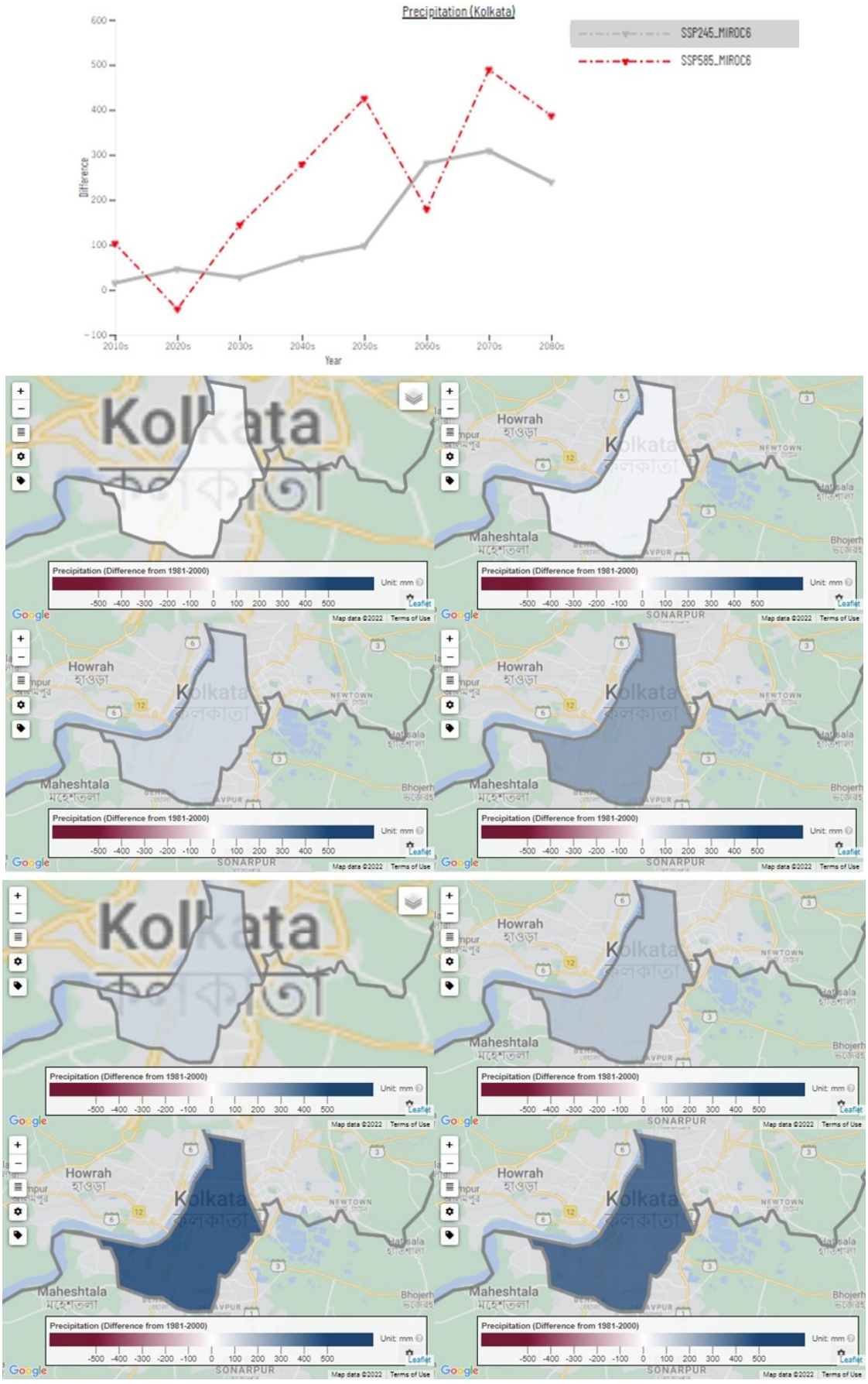

Figure 6.15: Precipitation variation in Kolkata under medium (grey) and high (red) emission scenario till 2080s (top); Spatial results for medium scenario for 2010s, 2030s, 2050s, 2080s (middle); Spatial results for high scenario for 2020s, 2030s, 2050s, 2080s (bottom)