Mega-suburb Heat-island Effect over Taiwan Western Plain

Shaw Chen Liu[1], Chuan-Yao Lin[1], Chein-Jung Shiu[1], Chung-Ho Wang[1,2], and Gin-Rong Liu[3]

1. Research Center for Environmental Changes, Academia Sinica, Taipei
2. Institute of Earth Sciences, Academia Sinica, Taipei
3. Center for Space and Remote Sensing Research, National Central University, Chung-Li, Taoyuan

ABSTRACT

Highly developed industry and a large density of population have turned the Western Plain of Taiwan into a mega-suburb with numerous cities, small towns, factories, and roads. As a result, the Western Plain is experiencing a regional scale heat-island effect that is clearly visible through remote sensing. The heat-island effect is large enough to induce significant regional climate changes. For example, the surface air temperature over Taiwan increased by about 1.2 degrees over the last century while the surrounding sea surface temperature (SST) increased by only about 0.7 degree. In addition, the diurnal temperature range has decreased by about 1.1 degrees since 1950, about twice the corresponding values over major continents. These changes, in turn, induce significant changes to other important meteorological parameters such as relative humidity. More importantly, we believe that the mega-suburb heat-island effect can significantly change the spatial distribution of thunderstorms in the Western Plain.