The Global Warming issue is already being a serious discussion subject among the scientist which the increase of Earth’s mean temperature level for the last 20-30 years can affect the life pattern of world society now days. Land Surface Temperature (LST) is one of the key parameter to study the temperature variation and energy balance and useful to determine the relation or correlation between temperature change and land use change. This research determines the temperature distribution and its correlation with land use change quantitatively. The study area for this research is Surabaya, which well known as one of the biggest cities in Indonesia. The land use data obtained from Landsat 5 TM and Landsat 7 ETM+ 1994, 1997, 2000, 2002, 2006, 2009 and 2012. To generate the LST, band 6 is utilized from Landsat 5 TM and Landsat 7 ETM+ for 1994, 1997, 2000 and 2002, meanwhile 1km spatial-resolution MODIS11A1 for 2006, 2009 and 2012. The difference in the use of the imagery
caused by the defective of sensor of Landsat 7 ETM+ since 2003 and its thermal band unuseable. The result of Landsat data processing with Supervised Classification method shows that there is a significant change rate of land use. For the urban area, the change is about 27,930,600 m² in a span of 18 years. Urban area is fully dominating Surabaya with 42,93% of its area covered the city in 2012. Meanwhile, vegetation area is decreasing for about 19,395,000 m² and it’s only covers 9,22% of Surabaya. For other types such as ponds, bare soil and water bodies, successively changing around -41,194,800 m², 31,320,900 m² and 8,625,600 m². The changes also occur in LST processing result with mono-window Brightness Temperature algorithm obtained from Landsat 5 TM and Landsat 7 ETM+. While on the MODIS11A1, LST values that appear is the result of MODIS product level 2 calibration process, so that additional algorithm is no longer needed. From 1994 until 2012, the recorded average temperature change is quite volatile, there is approximately 16° Celcius increase from 1994 until 2012 and then decrease about 10° Celcius in 2012. The correlation result obtained from temperature and land use processing is 0,974453242 for urban, 0,75278847 for vegetation and 0,411662773, 0,346883719 and -0,439332347 for ponds, bare soil and water bodies successively. The result of this research is the first step for upcoming researches to achieve better result by considering more qualitative factors.

**Keywords**: LST, Landsat 5 TM, Landsat 7 ETM+, MODIS11A1