



MODIS Land Surface Temperature Observations associated with the Gujarat Earthquake of 2001: A Statistical Analysis.

M. Blakett, M. Wooster, and B. Malamud

King's College, Geography, London, United Kingdom (matthew.blakett@kcl.ac.uk)

A large number of studies have claimed to have observed thermally manifested precursors to the Gujarat Earthquake of 2001. Many of these, however, have arguably examined insufficient quantities of data from which the “normal” conditions of the surface might be derived, and against which potentially anomalous observations might be compared. This work, in contrast, has analysed six-years of MODIS data to determine “normal” conditions of the surface at two differing spatial scales centred on the earthquake epicentre. These “normal” observations are compared with those of both the period of the earthquake, and those displayed throughout the whole six-year period, using statistically robust methods. This is with the aim of determining whether the observations at the time of the earthquake were, indeed, truly anomalous.

Various statistical techniques were applied to the extracted data to assess whether the observations made were truly anomalous. The distribution characteristics of the in-scene datasets were also examined to determine whether there were any unique statistical characteristics in the surface data around the time of the earthquake.

In terms of precursory observations, although peaks in LST (and other derived indices) were evident prior to the earthquake event, these were not shown to be statistically significant. In contrast, post-event peaks, particularly at the largest spatial scale of analysis (1500 km x 1501 km), were shown to be statistically anomalous. The cause of this post-event observation was hypothesised as being associated with post-event de-watering – an observation which has been widely associated with the earthquake event itself.