Significant changes in land, ocean and atmospheric parameters have been observed prior to earthquake events. Recently, Surface Latent Heat Flux (SLHF) has been found to exhibit anomalous behavior prior to large coastal earthquakes. The observed anomalies suggest the existence of interaction between the lithosphere and the atmosphere, and have opened up new possibilities to the use of remote sensing observations to identify and study earthquake precursors.

The yearly time series of the SLHF contains a large number of maxima peaks, several of which are more than 1 or 2 times above the standard deviation. These peaks are due to atmospheric phenomena, earthquakes, or ocean disturbances, and therefore the main challenging task is to identify the SLHF peaks that are precursors of an impending earthquake.

The SLHF is a parameter directly related to the evaporation of water on the surface. SLHF is particularly affected by changes in temperature over the land and over the oceans. The change in surface temperature can be due to atmospheric perturbations, such as strong winds, precipitation, intense cloud cover, or due to geological phenomena.

In this paper, we present a methodology based on wavelet transformations to find singularities in the data. A one dimensional wavelet transformation has been performed over one year of daily SLHF data using the second derivative of Gaussian as mother wavelet. The local maxima of the wavelet transform are computed at different scales, and interpolated along the scale/time plane to generate maxima curves. Each maxima curve corresponds to an anomalous peak.

The SLHF shows numerous peaks over the year which may or may not be associated with an impending earthquake. In the present methodology, we have considered only the peaks corresponding to maxima curves which propagate from finer to coarser scales and with a minimum length above a predetermined threshold. Additionally least significant peaks are filtered out by discarding those with magnitude below the average value computed using data for several previous years for the same time of the year.

The wavelet based method has also been found to be an effective technique to filter out peaks caused by small high frequency variations (causing very short maxima curves) and peaks caused by the seasonal trend of the SLHF, since maxima curves do not have to propagate to the coarsest scale.

The use of the present methodology will be demonstrated using SLHF data associated with the occurrence of several large coastal earthquakes for giving early warning information.