As the mean temperatures of the worlds oceans increase, it is predicted that marine heatwaves (MHWs) will occur more frequently and with increased severity however, it is hypothesised that more proximate variables may be responsible for these extreme events. An improved understanding of the mechanisms driving MHWs may allow us to better forecast their occurrence at specific localities. To this end we have utilized atmospheric (ERA-Interim) and oceanic (BRAN) reanalysis data to examine the air-sea state around southern Africa during coastal (<400 m from the low water mark) MHWs. Self-organising maps (SOMs) were used to cluster the mean air-sea states during MHWs into 1 of 9 types to determine the predominant patterns. It was found that warm water forced onto the coast via anomalous ocean circulation was the predominant oceanographic pattern during most MHWs. A range of distinct air temperature and wind patterns were found with warm air temperatures over the continent and strong north-westerly winds featuring most prominently during MHWs. It may therefore be possible to forecast the occurrence of MHWs when such air and sea states are projected to occur simultaneously. The lack of any strong air-sea patterns during roughly one third of the MHWs implies that sub-meso-scale activity may have been responsible for them and that finer scale observations may be necessary to deduce their physical drivers. These findings motivate for the implementation of local scale real-time *in situ* monitoring of at risk coastal locations in conjunction with the development of a forecasting and disaster prevention system.