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VISUALISATION OF SEA SURFACE TEMPERATURE VARIATIONS DERIVED FROM MODIS OBSERVATIONS

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Nowadays almost any kind of natural phenomena can be observed and monitored from space using Remote Sensing techniques. Modern sensors permit thorough study of the environment. As is known, ocean currents are a crucial indicator when investigation aims to study climate change because they are closely related to any variations. In consequence, and to take advantage of Remote Sensing, Sea Surface Temperature (SST) has to be monitored continuously from space with the aim to detect such spatio-temporal variations which might indicate any kind of anomaly.

Study area within this research is Marguerite Bay (Antarctica) on the west coast of the Antarctic Peninsula. There, two important currents, namely the Antarctic Coastal Current (ACoC) and the Antarctic Peninsula Coastal Current (APCC) interact with each other.

The ACoC is present all over the year and near Antarctic Peninsula, it gets a counter-clockwise surface current, which flows north-eastwards. APCC shuts down in winter while it gets fed from fresh meltwater during spring and summer and that way held up until fall. APCC is circulating along the Antarctic Peninsula southwards, passing Adelaide Island, entering Marguerite Bay and exits along the coast of Alexander Island.

Within this paper observations acquired from the Moderate Resolution Imaging Spectroradiometer (MODIS) are used to investigate SST in Marguerite Bay and its temporal variations. Subsets of 8-day composite 11 micron day- and nighttime observations are geocoded in the WGS 84 reference system UTM zone 19S. Their spatial resolution is 4km and one year continuous set of data is used. Subsequently Ordinary Kriging is applied to realize spatial interpolation between measured values and to overcome the problem of missing data. The resulting datasets that are free of any gaps, are visualized to firstly identify APCC as well as ACoC. Existence of APCC during spring and summer can be proven as well as its absent during winter. In a second step, by animating day-and nighttime observations, generating time series and changing opacity between consecutive datasets, their variations over time can be shown. This can be done for exclusive day- or nighttime SST series, as well as for mixed ones if necessary. If animation is generated for mixed series, composed by day- and nighttime data, a much more complete and detailed series can be visualized. This permits not only to study variations during day or nighttime exclusively but also SST variability due to day-night cycle.

It is expected that, if observations from a larger time series are studied, certain patterns in SST variations and variability can be identified. Therefore, on the basis of the results from this visualization approach, further studies can be carried out to start such long term monitoring and analysis.