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Analysis of sea surface temperature increase in Aegean Sea by using Landsat thermal band in long term period

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Abstract

In this study, sea surface temperature (SST) changes in the Aegean Sea were investigated over a period of 30 years by using Landsat thermal bands. The study area is the Aegean Sea, which includes the Gökova, Güllük, Didim and Kuşadası Gulf (Figure 1.). Twenty-four Landsat 5 and 8 thermal images of April, May, June, July, August, September, October and November of 1986, 2010 and 2016 were used. To estimate the SST from the thermal band data, the digital number (DN) of bands were converted to the brightness temperature by using that metadata. First, DN of sensors were converted to spectral radiance, then, spectral radiance was converted to brightness temperature by using Qgis software. Throughout the four transects the SST values of the same month for different years were analyzed. Lengths of transects; T1 31.4 km, T2 30.9 km, T3 53.9 km and T4 93 km.. The number of points sampled and analyzed throughout transects are 1024. In the selected months between 1987 and 2016, the difference between the minimum temperature averages and the maximum temperature averages in transects are: T1 3.363 oC – 2.869 oC, T2 3.654 oC – 3.088 oC, T3 3.610 oC – 2.936 oC, and T4 3.556 oC – 2.256 oC. The difference between the minimum temperature averages and the maximum temperature averages of all transects was determined as 3.546 oC and 2.787 oC. As can be seen in the graph (Figure 2.) according to year and month, it is seen that the SST in the selected research area in the Aegean Sea has increased by 2,787 oC to 3,546 oC in the last 30 years. Long-term field work will need to be undertaken in order to be able to understand whether this increase is due to climate change or other natural or human causes.

Keywords— *Aegean Sea, Landsat thermal, sea surface, SST, temperature, Turkey*

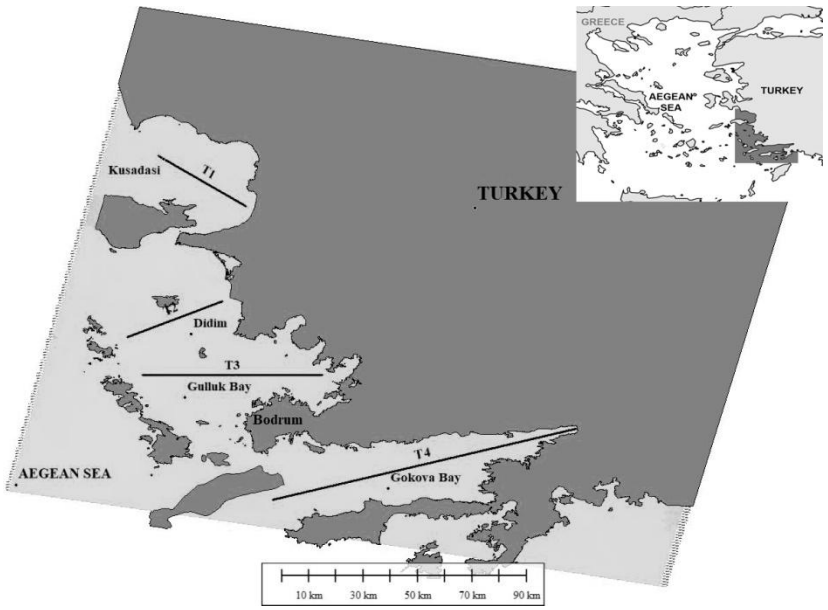


Figure 1. The study area (T1,2,3 and 4 are transects)

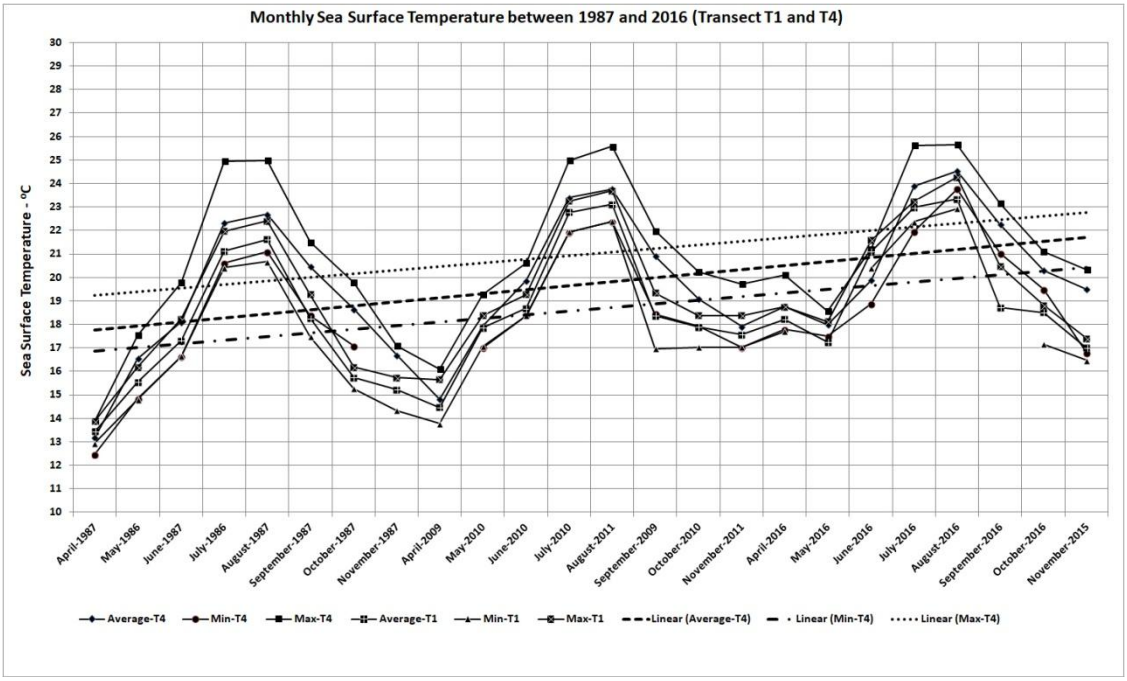


Figure 2. Monthly sea surface temperature between 1987 and 2016 (T1 and T2)

Professional Biography (100-150 words)

Tuncay Kuleli has completed his PhD at the age of 29 years from Cukurova University, Turkey. He is the Director of Bodrum Maritime Vocational School, Mugla SK University. He has published more than 10 papers in reputed journals and has been serving as an editorial board member of Journal of Geodesy and Geomatics Engineering, and Journal of Water Resources and Ocean Science.



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Any Comments:

I hope it will be a productive and successful organization.

Best Regards,

Prof. Dr. Tuncay Kuleli