# Estimation of Evapotranspiration based on METRIC and SEBAL model using Remote sensing, near Al-Jouf, Saudi Arabia

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## Abstract

The current study focuses on estimating evapotranspiration in arid and semi-arid environment in Norther part of Saudi Arabia near to Al Jouf. The objective of the research is to study, analysis and estimate Evapotranspiration (ETr) using SEBAL (Surface Energy Balance Algorithm for Land) and METRIC (Mapping of Evapotranspiration at high Resolution using Internalized Calibration) model and comparing with LST (Land Surface Temperature). The image was processed in ArcGIS and Matlab software with toolbox LandMOD ET mapper. The area average Evapotranspiration is about 2.21mm/day for METRIC model, 2.6mm/day for SEBAL and the average Land surface Temperature is 333 Kalvin. There is highly inversely correlated between ET and Land surface temperature which is about $R^2 = 0.8$. The value of ET ranges from 0.05 to 8 mm for both SEBAL and METRIC model during 2019/07/07. Both highly elevated and agricultural area shows high value of ET ranges from 5 to 8 mm/day. In addition, The Normalized Differential Vegetation Index (NDVI), LAI (Leaf Area Index) and Emissivity also calculated from Surface energy balance equation. The estimation of ETr from SEBAL model is better than METRIC model based on $R^2$ of different vegetation indices. The importance of the work is estimate ET and explain the impact in Environmental effect for better planning in Water resource development.