

# **Estimation of canopy water content from MODIS using artificial neural networks trained with radiative transfer models**

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The estimation of canopy water content from MODIS measurements using Artificial Neural Networks (ANN) is investigated. Monitoring vegetation water content can be useful, for example, to detect water stress and overwatering practices in agricultural crops, assess soil water availability, estimate forest health or predict wildfire behavior and wildfire danger. Remote sensing provides spectral information related to water status with the advantage over field sampling of providing spatial and temporal coverage estimates.

Previous studies have demonstrated the relationship between canopy water content and canopy reflectance in the near infrared spectral region. We have used ANN to estimate equivalent water thickness (EWT) obtained from hyperspectral water retrievals from AVIRIS data. To this end we have trained the ANN with a synthetic dataset obtained from a radiative transfer model and used these ANN to estimate experimental EWT measurements obtained at a semiarid site in southeastern Arizona, USA. We have compared the estimations of the ANN when using two different types of inputs, MODIS bands and band-ratios indexes. We have found that the estimations obtained from band-ratio indexes are better than those obtained from MODIS bands. We have also studied the effect of the radiative model used in generating the dataset, the effect of the soil reflectance and compared the results with those obtained by the inversion of the radiative transfer model.