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Satellite-derived parameterisation of vegetation cover fraction, albedo and conductance in the Australian Water Resources Assessment model

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Satellite land surface products were combined with other information to spatially estimate fractions of evergreen (considered equivalent to deep-rooted) and seasonal (shallow-rooted) vegetation across Australia, and to parameterize albedo and maximum surface conductance for both vegetation types. Maximum surface conductance was estimated from the Enhanced Vegetation Index (EVI), both expressed on a unit canopy area basis using the MODIS Fraction absorbed Photosynthetically Active Radiation (FPAR) product. Albedo was well correlated with EVI and surface wetness, estimates of which were provided by the 1km ASAR GM (A Synthetic Aperture Radar Global Mapping mode) based soil moisture product. The more explicit parameterization of vegetation demonstrably improved water balance predictions, particularly in seasonally water-limited areas, which includes most of Australia for most of the time. The data and procedures have been incorporated in the Australian Water Resources Assessment (AWRA) system under development by CSIRO and the Australian Bureau of Meteorology to underpin operational delivery of water resources information. Dynamic updating of vegetation and land surface properties through data assimilation is currently being trialled in a pseudo-operational context.