

**CROSS COMPARISON OF SPOT-4 VEGETATION AND NOAA-14 AVHRR  
NORMALIZED DIFFERENCE VEGETATION INDEX  
DATA FOR CONTINUITY STUDIES**

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## **ABSTRACT**

Spectral vegetation indices obtained from satellite sensors have been used to measure and monitor the Earth's vegetative cover from local, regional, to global scales. The normalized difference vegetation index (NDVI) has been the most widely-used index and shown to correlate with green leaf area index, green biomass, and net primary productivity. The NDVI from the two sensors, National Oceanic and Atmospheric Administration (NOAA)-14 Advanced Very High Resolution Radiometer (AVHRR) and Systeme Pour l'Observation de la Terre (SPOT)-4 VEGETATION, were evaluated for their cross-sensor relationships and continuity/compatibility. Data continuity of AVHRR and VEGETATION NDVI is of critical importance for the generation of a seamless, long-term data record for global change studies. AVHRR daily NDVI data and VEGETATION 10-days NDVI composites were obtained over the Earth Observing System validation core sites within the conterminous USA for year 1998. The NDVI temporal profiles derived from AVHRR and VEGETATION were comparable, both depicting seasonal evolution of green vegetation in the same manner. However, the AVHRR NDVI temporal profiles showed pseudo-seasonal patterns due to seasonal cycles in atmospheric water vapor. AVHRR and VEGETATION NDVI showed a strong linear relationship with more than 95% of the variation explained by a simple linear model ( $R^2 = .95$ ). The strength of the relationship decreased when AVHRR NDVI were not corrected for water vapor ( $R^2 = .88$ ). We conclude that the NDVI from SPOT-4 VEGETATION and NOAA-14 AVHRR can be used interchangeably for vegetation phenology studies and the relationship between the two can be modeled via a simple linear model; however, correction of atmospheric water vapor is a critical, necessary preprocessing step for deriving a stable time-series.

