INFERRING SOIL MOISTURE IN WEIHE BASIN WITH MODIS PRODUCT

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ABSTRACT

In present paper, Daily MODIS temperature product MOD11A1,16-day composite MODIS NDVI product MOD13A2 and 8-day composite MODIS LAI product are used to get Land surface temperature(TS), difference temperature(TSD), apparent thermal inertia(ATI), normalized difference vegetation index(NDVI), enhanced vegetation index(EVI), and leaf area index(LAI). Then, TS, TSD, ATI, NDVI, EVI and LAI are used to construct TS-NDVI, TS-EVI, TS-LAI, TSD-NDVI, TSD-EVI, TSD-LAI, ATI-NDVI, ATI-EVI and ATI-LAI space. From these space, temperature normalized difference vegetation index dryness index(TNDI), temperature enhanced vegetation index dryness index(TEDI), temperature leaf area index dryness index(TLDI), difference temperature normalized vegetation index dryness index(DTNDI), difference temperature enhanced vegetation index dryness index(DTEDI), difference temperature leaf area index dryness index dryness index(DTLDI), apparent thermal inertia normalized vegetation index dryness index(ANDI), apparent thermal inertia enhanced vegetation index dryness index(AEDI) and apparent thermal inertia leaf area index dryness index(ALDI) are suggested to infer soil moisture in Weihe basin in August 1st,2006 and August 6st,2006. After correlation analysis between dryness index and the measured topsoil moisture, the result show that TNDI, TEDI, TLDI have more significant linear correlation with soil moisture than others, and TEDI is the most promising method to infer soil moisture; DTNDI, DTEDI, DTLDI, ANDI, AEDI and ALDI have better linear correlation with soil moisture when dense vegetation covered, but have worse linear correlation with soil moisture when thin vegetation covered and bare surface, so these dryness index are not competent for inferring soil moisture and monitoring drought.

Key words: soil moisture; MODIS; Weihe Basin