

Use of remote sensing data for estimation of winter wheat yield in the United States

L. Salazar (1), F. Kogan (2), L. Roytman (3)

(1) Optical Remote Sensing, NOAA CREST Center, City College of New York, USA, (2) NOAA, National Environmental Satellite Data and Information Services, Camp Springs, Maryland 20776, USA, (3) City College of New York, Convent Av. New York NY 10031, USA

This paper shows how remote sensing data can be used to estimate winter wheat yield in Kansas. The algorithm uses the Vegetation Health (VH) Indices (Vegetation Condition Index (VCI) and Temperature Condition Index (TCI)) computed for each week during a period of 23 years (1982–2004) from Advance Very High Resolution Radiometer (AVHRR) data. The weekly indices were correlated with the end of the season winter wheat (WW) yield. A strong correlation was found between winter wheat yield and VCI (characterizing moisture conditions) during the critical period of winter wheat development and productivity that occurs during April–May (weeks 16–23). Following the results of correlation analysis, the principal components regression (PCR) method was used to construct a model to predict yield as a function of the VCI computed for this period. The simulated results were compared with official agricultural statistics showing that the errors of the estimates of winter wheat yield are less than 8%. Remote sensing is a valuable tool for estimating crop yields well in advance of harvest and at a low cost.