

Using ReSET Model to Estimate the Evapotranspiration of the Irrigated Crops in the South Platte River Basin, Colorado

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Abstract. The approach presented in this study uses information derived from remote sensing to estimate (ET) as a residual from the surface energy balance equation. The objectives of this study are: 1) estimate the ET of the different irrigated crops in the South Platte River Basin; 2) compare the irrigated areas and the consumption use for the years 2001 and 2010; and 3) investigate the impact of irrigation system (flood/sprinkler) on the estimated ET. 54 Landsat 5/7 satellite images that cover the study area for the growing season of 2001 and 2010 were acquired and processed. In addition, the metrological data were collected from the Northern Colorado Water Conservancy District (NCWCD) on hourly and daily basis. The results of this study show that the irrigated area slightly decreased from 368,474 ha in 2001 to 344,204 in 2010, however, the flood area decreased to 56.6% and the sprinkler area increased to 43.4%. The estimated ET using the ReSET model for the year 2001 was 2,032,610 AF with 66.1% flood and 33.9% sprinkler. However, estimated ET for the year 2010 was 1,887,945 AF with 54.6% flood and 45.4% sprinkler. The average AF/A for all irrigated area for 2001 was 2.23 with 2.18 for flood and 2.34 for sprinkler, while the average AF/A for all irrigated area for 2010 was 2.22 with 2.14 for the flood and 2.32 for the sprinkler. The errors of the estimated seasonal ET values using the ReSET model compared to the reference ET of the metrological stations were less than 0.05.