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ASTER observations of the Elephant Butte Reservoir in New Mexico

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For many reservoirs there is much fluctuation in water levels as water is drawn down for irrigation purposes. We present satellite observations of changes in the surface water area as evidence of this drawdown. Since the launch of NASA's Terra satellite in December 1999 the Advanced Spaceborne Thermal Emission and Reflection (ASTER) radiometer has made more that 2 dozen of observations of the Elephant Butte Reservoir located on the Rio Grande river in central New Mexico including night observations of surface temperature. The first observations were in June 2000 and the most recent were in December 2005. This period includes low water levels resulting from the the recent drought conditions and the earlier full high water conditions in 2000. There was about a 25 m change in water level during this time reducing the water storage by more than half. The area of the reservoir was estimated for each of these scenes and compared the with known water levels. The ASTER data were the Level 2 products which include both the visible reflectance and the thermal infrared (surface temperature). Both spectral regions provide good contrasts between water and surrounding land. This contrast makes the area estimation straightforward. there was a large range in surface water area observed from 30,000 km*2 to more than 75,000 km*2. An approximately linear relation between area and water level was found.