Severe Tropical Cyclone Yasi in early February 2011 was the most intense cyclone to hit north Queensland, Australia since 1918. It began developing as a tropical low northwest of Fiji on 29th January and started tracking on a general westward track. Yasi maintained its west-southwest movement and rapidly intensified from a Category 2 to Category 5 when making landfall on the north Queensland coast near Mission Beach between midnight and 1am early on 3rd February. As is true in any extreme storm, while large waves and currents were expected, directly in-situ surface observations were unavailable during Yasi. However, satellite radar altimetry provides important sea level measurements along several ground tracks during this period. In this study, wind speed, wave height, and sea level are analysed along satellite ground tracks using both satellite altimeter Jason-1 and Jason-2 data. The results clearly show the Yasi’s west-southwest movement and potential of forecasting extreme sea level by using satellite radar altimetry.