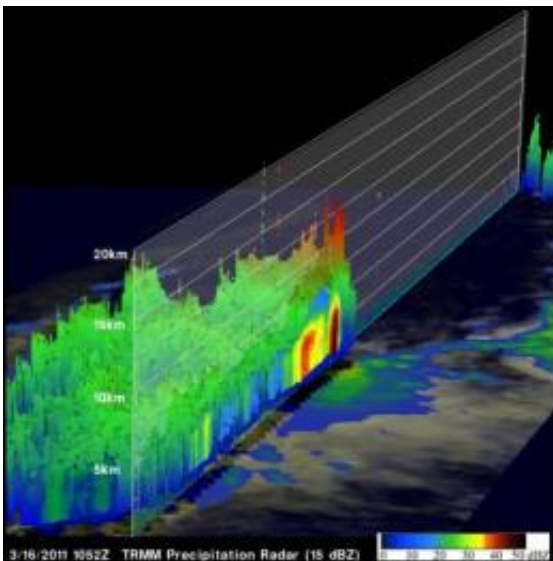


NASA satellites show towering thunderstorms in rare sub-tropical storm Arani

March 16 2011



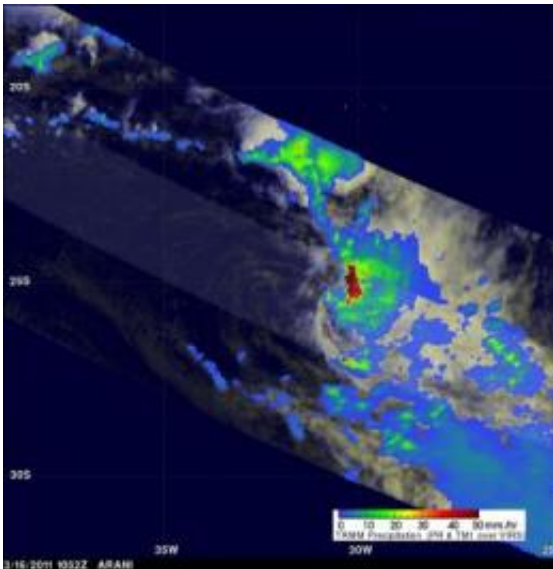
This 3-D view of Sub-tropical Storm Arani's clouds was created from data taken by NASA's TRMM satellite. It showed that there were very heavy thunderstorms (red) in the eastern half of the storm. TRMM's Precipitation Radar showed that some of these powerful storms were reaching to heights of over 14 km (~8.7 miles) above the surface of the Southern Atlantic Ocean. Credit: NASA/SSAI, Hal Pierce

NASA's Aqua and TRMM satellites are providing data to scientists about the Southern Atlantic Ocean Sub-tropical Storm Arani, a rare occurrence in the southern ocean. Rainfall data and cloud top

temperatures revealed some heavy rain and strong thunderstorms exist in Arani as it continues to pull away from Brazil.

NOAA's Satellite and Information Service classified Arani as a T1 on the Dvorak intensity scale which would indicate an estimated wind speed of about 29 knots (~33 mph).

During the daytime on Tuesday, March 15 at 1820 UTC (2:20 p.m. EST) NASA's [Tropical Rainfall](#) Measuring Mission (TRMM) satellite flew over Sub-Tropical Storm Arani. TRMM [rainfall data](#) showed that the storm contained mostly moderate rainfall, falling at a rate between 20 and 40 millimeters (.89 to 1.57 inches) per hour. However, there were some areas of heavy rainfall in the north and eastern quadrants of the storm. The heavier rainfall was occurring at about 50 mm or 2 inches per hour. TRMM's Microwave Imager (TMI) and Precipitation Radar (PR) data were used in the image above to show rainfall near Arani.



The TRMM satellite had another very good view of Sub-tropical Cyclone Arani in the morning light on March 16, 2011, at 1052 UTC. This data showed that there were very heavy thunderstorms in the eastern half of the storm. TRMM's

Precipitation Radar showed that some of these powerful storms were reaching to heights of over 14 km (~8.7 miles) above the surface of the Southern Atlantic Ocean. Credit: NASA/SSAI, Hal Pierce

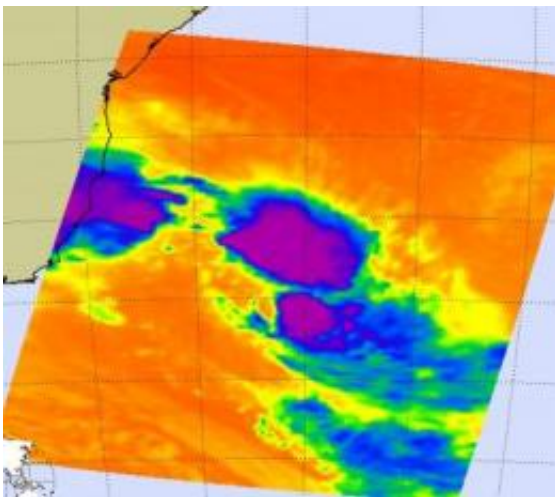
On Mar. 16 at 03:29 UTC (Mar. 15 at 11:29 p.m. EST) another of NASA's fleet of Earth science satellites flew over Sub-tropical Storm Arani and took its temperature. NASA's Aqua satellite captured an infrared image of Sub-Tropical Storm Arani's cold thunderstorm [cloud tops](#) in two areas of the storm. The Atmospheric Infrared Sounder (AIRS) instrument that flies aboard Aqua provided infrared readings of those cloud tops and showed that they were as cold as or colder than -63F/-52 C, and were areas of heavy rainfall. The strongest thunderstorms wrapped from the north, eastward to the south of the center of circulation, confirming the data from the TRMM satellite.

Later on March 16, at 10:52 UTC (6:52 a.m. EST), the TRMM satellite again passed over Sub-Tropical Storm Arani and noticed it still had some strong thunderstorms and was producing heavy rainfall off the Brazilian coast.

TRMM data was used to create a 3-D view of Sub-tropical Storm Arani's clouds, and it showed that there were very heavy thunderstorms in the eastern half of the storm. TRMM's Precipitation Radar showed that some of these powerful storms were reaching to heights of over 14 km (~8.7 miles) above the surface of the Southern Atlantic Ocean.

Arani has the appearance of a tropical cyclone but has been classified as a subtropical cyclone. Subtropical cyclones are low pressure areas that develop with a cold core and transition to a warm core in the mid-levels of the troposphere, resembling a tropical cyclone. They more typically form outside of hurricane season (which is June 1 to Nov. 30 in the

Northern Atlantic, for example). They also have broad wind patterns and that means that their maximum sustained winds are usually located farther from the center than a tropical cyclone. They also have no weather fronts linked to them, such as a typical low pressure area that brings summertime storms with an associated cold front. Subtropical cyclones can sometimes become tropical cyclones, and occasionally, tropical cyclones can become subtropical.



On March 16 at 03:29 UTC (Mar. 15 at 11:29 p.m. EST) NASA's Aqua satellite captured an infrared image of Sub-Tropical Storm Arani's cold thunderstorm cloud tops (purple) in two areas of the storm. Those cloud tops were as cold as or colder than -63F/-52 C, and were areas of heavy rainfall. The strongest thunderstorms appeared north and south of the center of circulation. Credit: NASA/JPL, Ed Olsen

Tropical cyclones are very rare in the Southern Atlantic Ocean. In 2004 a cyclone called Catarina formed in the South Atlantic and caused some controversy when it was classified as a hurricane by the United States' National Hurricane Center.

Arani is over the open waters of the Southern Atlantic and continues to move east-southeast and farther away from Brazil.

Provided by NASA's Goddard Space Flight Center

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