SPACE TECHNOLOGIES AS SUPPORTING TOOLS FOR THE MITIGATION OF THE DISASTER IN RIO GRANDE DO SUL - BRAZIL

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Floods which occurred in the Brazilian state of Rio Grande do Sul (RS) between late April and early May 2024;

On May 5th, the federal government declared a situation of public calamity;

The government of RS classified the situation as "the biggest climate catastrophe" in the state's history;

In total, 478 municipalities in RS were affected by floods, falling barriers and landslides;

Around 2.3 million people were affected by the effects of the rains;

The National Confederation of Municipalities estimated that the floods caused losses of 4.6 billion reais (around 845 million dollars);

The biggest loss in the insurance sector caused by a single event in the history of Brazil.
THE RS DISASTER

Satellite images and geographic information systems developed at INPE supported the analysis of the tragedy caused by the effects of the rains;

INPE provided images from the AMAZONIA-1 and the of Sino-Brazilian satellites CBERS-4, CBERS-4A;

INPE is a member of the International Space and Major Disasters Charter, a consortium of multi-country space agencies that provides free satellite imagery in situations;

To operate in Brazil, the consortium must be activated at the request of the National Center for Risk and Disaster Management (CENAD);

INPE Provided images and data from the Brazilian satellites and from other space agencies to CENAD aiming the support of the decision-making process;

The activation of the Charter for the disaster in Rio Grande do Sul acquired 1589 images and more than 136 maps are available;

The set of images provided by satellite allows checking the extent of damage in planted areas, industrial and residential areas;

https://cgt.disasterscharter.org/en/875
Brazil’s CBERS-4A and CANADIAN RCM

INPE made available on May 3rd in the Charter, the first map that shows the extent of the floods;

The record reveals that the area flooded by the Taquari River, in a stretch between the municipalities of Bom Retiro and Taquari, reached an area of around 100km²;

The processing was carried out using images captured by the Brazilian CBERS-4A satellite and the Canadian RADARSAT Constellation Mission (RCM);

The background image was acquired with an optical camera in January this year. Above it is the red spot, acquired by Canadian satellite radar on May 1, revealing the extent of the flood.
The extension of the historic flood that hit the state of RS was recorded by AMAZONIA-1 in a single image, on the 6th of May;

The image records an area of 160 thousand km² (57% of the state territory) and shows the flooded areas in the river basins most affected by the rains;

Large-scale images make it possible to observe where the greatest damage is, allowing for a more orderly response than one based on local perspective;

AMAZONIA-1 satellite is equipped with a wide-view camera (WFI sensor) with spatial resolution of 64 meters, located in low orbit (around 700 km), with a viewing width of 800 km, and recording images of Brazil every three days;

Camera with this capability is unique in the world.
Detailed satellite imagery also helped map the extent of flooding, identify areas at high risk of further flooding, and assess damage to critical infrastructure such as roads, bridges and buildings; This information is invaluable to emergency response teams and local authorities in coordinating rescue operations and allocating resources where they are needed most;

These images provide a visual representation of the widespread destruction caused by the floods, allowing authorities to assess the scale of the devastation in different regions; By comparing satellite images taken before and after floods, experts can identify areas that have been most severely affected, allowing them to prioritize rescue and relief efforts effectively;
CONCLUSION

Satellite images made possible to access the exact location of the areas affected by the floods in RS; By providing detailed visual data of affected regions, satellite imagery has enabled authorities to make informed decisions, prioritize resources effectively, and quickly respond to the needs of affected communities; This allowed the government to cross-reference this data with information from other agencies, ensuring that reconstruction aid was really targeted at the most affected families; Continued investment in satellite technology and data analytics capabilities is essential to building resilient communities and mitigating the impact of natural disasters in the future.
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Thank you!