Paris Session 2022

Metereological Data Monitoring to Improve the Fault Location and Identification

B5 PROTECTION AND AUTOMATION

PS2 – Applications of emerging technology for protection, automation and control, Q2.03

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Presentation Time to be Proposed: 3 or 4 min

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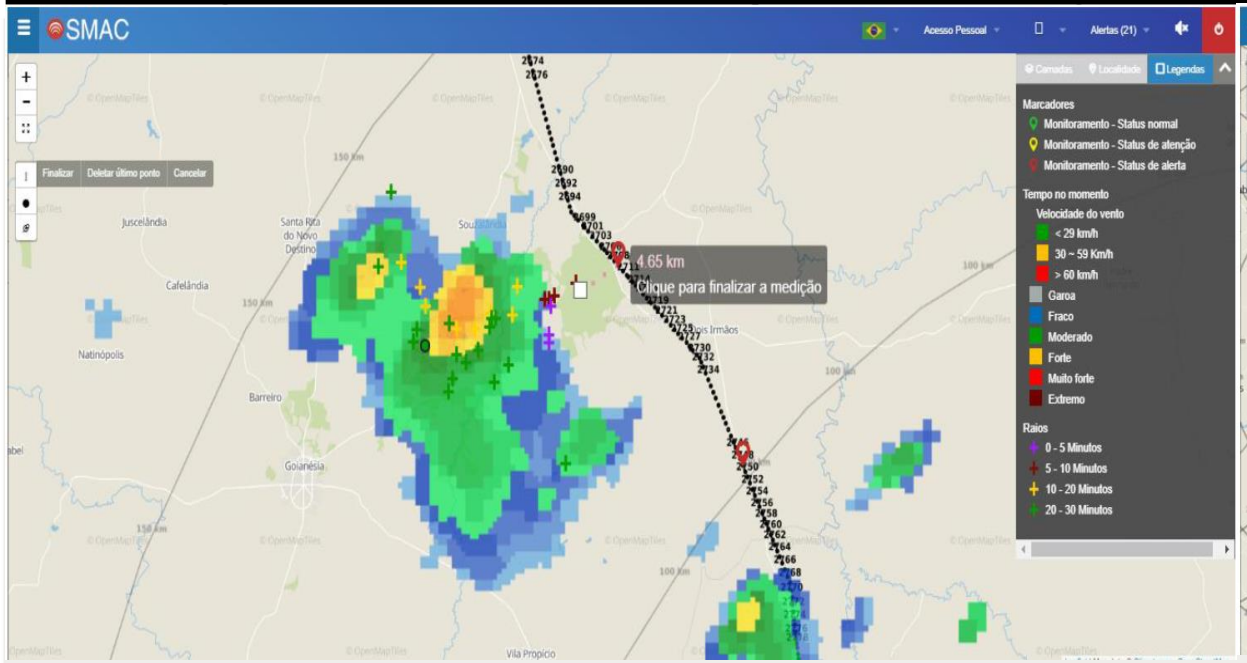
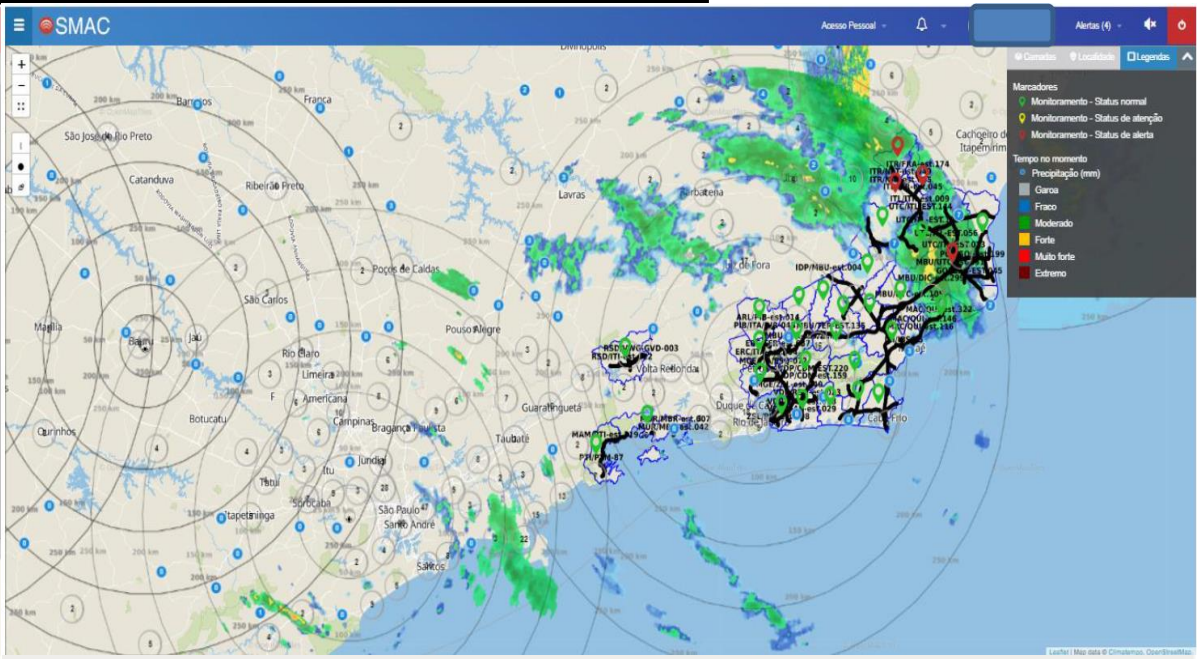
Monitoring the Incidence of Atmospheric Discharges – Lightning Strikes – Fire Estimation



Rainfall Monitoring x Atmospheric Discharge



Metereological Radars for Rainfall Monitoring in Southeastern Brazil

- The use of resources for fault location, including Atmospheric Discharge (AD), lightning and fire estimation has been very useful for the first identification of faults on high voltage Transmission Lines (TL);
- Brazil has more than 150.000 kilometers of TL (V≥230kV) ➔ being considered a country with a continental extension ➔ where nature events are part the daily routine of some Brazilian TSOs;
- With so many assets spread throughout Brazil ➔ many companies find problems justifying the interruption of a certain section of one TL, after a AD or even a fire nearby ➔ physical access becomes very difficult;
- Cloud-to-cloud and cloud-to-ground data ➔ showing with precise location of each discarge ➔ including the AD current estimation, in kA, discharge resolution reaches up to 200 meters, updating the images minute by minute.

Group Discussion Meeting
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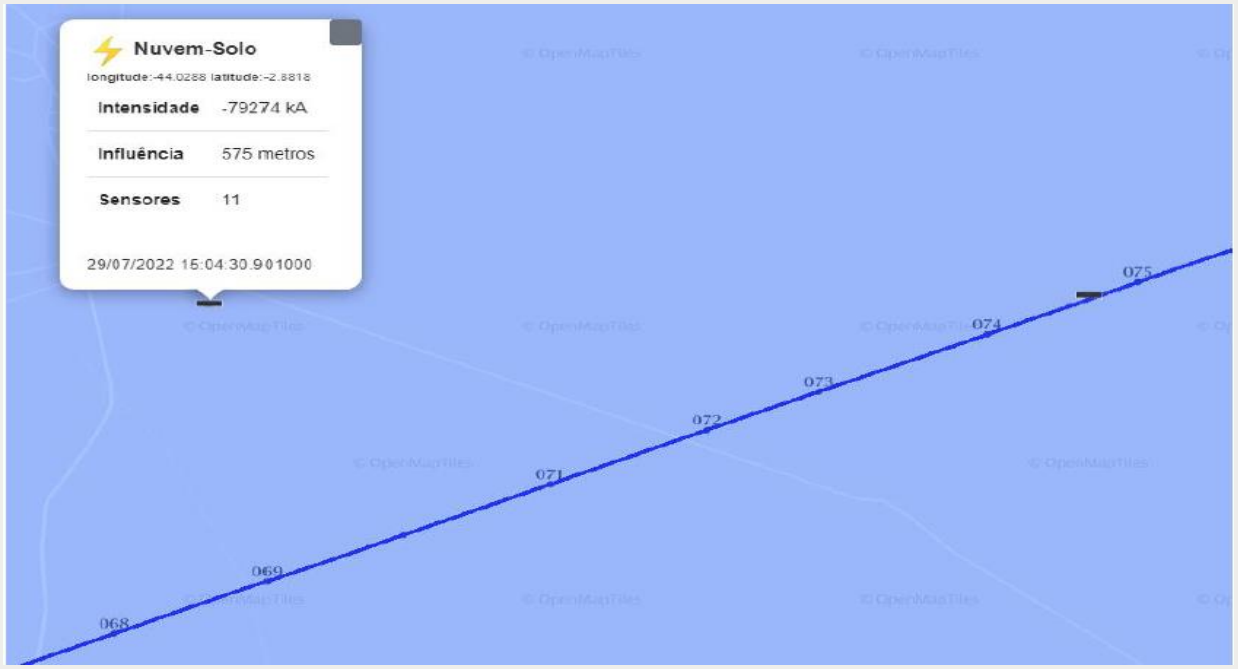
Real Case Disturbance in the BIPS

Fault Distance Calculation and Transmission Towers Identification



Atmospheric Discharge Identification and Transmission Towers Identification

- On July 29, 2022, at 15:04h (GMT-03h) there was an automatic disconnection of a 500 kV TL in the BIPS;
- The fault was identified by the TSO protection team department (single-line to ground fault);
- The TL has a length of 286 km ➔ protection relay identified the Fault Location (FL) at 29,9 km from one reference terminal;
- SMAC tool located the fault at 36,5 km from this reference terminal ➔ between towers 69 and 71, and magnitude of AD around 79 kA (causing the backflashover phenomenon).

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Field Inspection – Maintenance Team

Atmospheric Discharge Identification – Tower nº 69

- After visual identification, carried out by TSO maintenance team, traces of AD were found on the insulators;
- Total time duration after disturbance until identify the root-cause in the field using SMAC software ➔ 2 days only!
- The use of support tools to locate and identify faults on high voltage transmission lines is extremely important for root-cause analysis by the maintenance and also by TSOs disturbance analysis team.

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