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Poster
As climate change accelerates, we are witnessing a notable uptick in the frequency and intensity of extreme weather events, a phenomenon that is no longer anticipated but observed in current environmental trends. This shift is not merely a statistical anomaly, it has important implications for human health, environmental sustainability, and a multitude of economic sectors, including the oil and gas industry. Could these extreme weather events lead to an increase in methane emissions on oil and gas infrastructures?

The Methane Alert and Response System (MARS), designed by UNEP's International Methane Emissions Observatory (IMEO), is the first global system connecting satellite methane detection to transparent notification processes that promotes on-the-ground emissions mitigation efforts. MARS uses a number of methane-sensitive satellites to build a monitoring and alerting system for large methane emissions on a global scale, which are then reported to governments and companies and tracks mitigation efforts. In January 2024, Texas experienced a cold snap, which triggered an unusual number of MARS methane emission alerts in the Permian Basin area. These emissions were observed by different satellites and space sensors integrated in the MARS system, such as the multispectral satellites Sentinel-2, Landsat, or Sentinel-3, the hyperspectral PRISMA, EnMAP and EMIT, or the geostationary satellite GOES. The identified emissions were notified to the relevant stakeholders and monitored over time.

In this contribution, we will show how MARS, using remote sensing data, successfully observed, tracked, and analysed this emission increase event. As extreme events become more frequent, systems like MARS are vital to identify potential climate feedback loops.
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