Contribution ID: **25371** Type: **Extended Abstract**

Atmospheric Monitoring of Accidental Radioactive Releases and Source Term Reconstruction

Tuesday, 4 November 2025 10:30 (15 minutes)

The rapid detection and characterization of accidental radioactive releases is critical for public safety, environmental protection, and informed emergency response. In the Gulf region, the increasing presence of nuclear power infrastructure—including the operational Barakah Nuclear Power Plant (UAE), the Bushehr facility (Iran), and a planned plant in Saudi Arabia—necessitates robust regional monitoring and response systems. Accidental atmospheric releases from these facilities could pose transboundary risks, highlighting the importance of coordinated preparedness and decision-support capabilities.

This study presents a comprehensive framework tailored to the Gulf region that integrates three core components: (1) generation of a state-of-the-art dispersion scenario database using a source-receptor matrix approach; (2) spatial optimization of ground-based monitoring networks for enhanced early detection and plume tracking; and (3) application of inverse modeling techniques to reconstruct the source term, including emission rate and possible location. Together, these components aim to strengthen nuclear safety and emergency response capabilities under scenarios of severe atmospheric releases.

Technical Track

Safety and Severe Accidents

Primary author: ABIDA, Rachid (Khalifa University of Science and Technology)

Co-authors: Dr RIAHI, Mohamed Kamel (Khalifa University of Science and Technology); Prof. ADDAD, Yacine (Emirates Nuclear Technology Center (ENTC), Khalifa University of Science & Technology)

Session Classification: Safety and Severe Accidents