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SIMPAX: A Prototype Software Application Simulating the Impact of Radioxenon Emissions from Civil Sources on IMS Stations

The Comprehensive Nuclear-Test-Ban Treaty (CTBT) established a global monitoring system for atmospheric xenon radioactivity as part of the International Monitoring System (IMS).
During the International Noble Gas Experiment (INGE), a significant correlation between radio-xenon background and geographical region was observed. Investigations on the radio-xenon background have highlighted that different nuclear civil applications were contributing to this background. The major contributors to this background are a few Medical Isotope Production Facilities dispersed all around the world; other smaller contributors are Nuclear Power Plants and Hospitals.

The radio-xenon background makes the discrimination between radio-xenon detections from civil nuclear applications and from nuclear testing a very complex task. The scientific challenge is to develop algorithms and tools that facilitate the understanding of the background. The longer-term vision is to eventually predict the impact of civil sources on the radio-xenon detections at the IMS stations. With the goal of gaining first experience and scientific insight, a prototype software application is developed at the International Data Centre (IDC) to calculate hypothetical radio-xenon concentrations at IMS stations, based on a combination of source-receptor sensitivity (SRS) fields and estimated civil radio-xenon releases. The software tool is baptized SIMPAX – Prototype (Simulated IMPAct of Xenon).

The contribution aims at presenting the key features of SIMPAX prototype in terms of simulation model, input definition and output format.

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