ID: Type: **Oral**

1.3-O8. Variability in subsurface gas transport in the light of field experiments and numerical modeling

Before being detected at the surface during OSI or in the atmosphere by IMS stations, radioactive gases migrate through heterogeneous rocks and soil. How much of the source term is emitted to the atmosphere? Can frozen or snow-covered soils prevent emission? How to define sampling strategies? Tracing experiments were conducted to investigate gas transport mechanisms in the subsurface. First, krypton was injected at sub-atmospheric pressure in shallow fractured rocks of the Roselend Natural Laboratory (France). Boreholes , tarps and chambers at the surface were used to monitor tracer migration, which showed a very strong spatial and temporal heterogeneity. Second, SF6 was spread over frozen sandy soil and below snow cover at another experimental site (Vaudreuil, Canada). SF6 migration was monitored in soil and snow throughout the winter, during thaw-freeze and snow melting. Gas migration depends on frozen water content in soil and snowpack structure. In such conditions, barometric pumping is not always the main control on gas migration in the subsurface, while gas density and thermally driven advection and diffusion may have large influence. Besides contributing to understanding migration processes, these field experiments offered a test bed for sampling strategy and technology from which existing means get reinforced.

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