

AGA 6: Nuclear Weapon Effects

Time: Thursday 15:15–17:15

Location: KH 00.016

Invited Talk AGA 6.1 Thu 15:15 KH 00.016
Modeling Nuclear Weapon Effects from Trinity to Nuclear War — •SÉBASTIEN PHILIPPE — University of Wisconsin*Madison
The Trinity nuclear test of July 16, 1945 marked the first uncontrolled, large-scale release of radioactive material into the atmosphere. In the decades that followed, more than 500 atmospheric nuclear tests produced fallout at local, regional, and global scales, exposing populations worldwide. Yet the spatial and temporal distribution of this fallout remains only partially characterized. This presentation shows how modern tools - combining high-resolution atmospheric transport models, reanalyzed historical meteorological data, and physics-based nuclear explosion source terms*enable a new generation of fallout reconstructions. These methods yield hour-by-hour deposition estimates at kilometer-scale resolution, improving assessments of radiological exposure from historical testing, including in regions with sparse or absent monitoring data. The same framework scales directly to contemporary nuclear conflict scenarios. When integrated with population, infrastructure, agricultural, ecological, and other prompt nuclear effects, it enables comprehensive assessments of the physical, environmental, and societal consequences of nuclear war.

Invited Talk AGA 6.2 Thu 16:15 KH 00.016
From Local Impacts to Global Risks: New Science on Nuclear War Consequences — •FRIEDERIKE FRIESS — BOKU University, Vienna

Heightened geopolitical tensions have renewed attention to the health and environmental consequences of nuclear explosions and war. Reflecting this urgency, WHO has convened a new working group to update its reports on nuclear weapons and health, and the UN Scientific Panel on the Effects of Nuclear War began work last summer, with a comprehensive assessment due by September 2027. Drawing on literature reviews and the authors' participation in the UN panel and respective research, this presentation traces the field's evolution from understanding local impacts to globally integrated monitoring and modeling. We highlight two active areas of research and debate: atmospheric transport of radioactive particles, moving beyond idealized spherical assumptions to more realistic morphologies; and the magnitude of global consequences governed by soot injection from large fires, with implications for climate perturbations and downstream risks to food security and public health.