



IAG Scientific Assembly 2025: Geodesy for a changing environment

Symposium G01: Reference Frames

Conveners: Urs Hugentobler, Krzysztof Sośnica, Mathis Bloßfeld, Fernand Bâle, Maria Karbon

G01-1: Space Techniques: Prerequisites for current and future terrestrial and lunar missions

Conveners: Krzysztof Sośnica

Space techniques play a fundamental role in the realization and dissemination of highly accurate and long-term stable terrestrial and celestial reference frames as well as for accurate monitoring of the Earth orientation parameters linking the two fundamental frames. Strengths of the techniques are exploited by combining them making use of co-location at fundamental observatories, co-location targets in space, and exploiting common parameters. Future terrestrial and lunar missions require developing techniques and methodologies for co-location in space and a proper definition of lunar reference frames and time scales with the proper connection to the terrestrial frames and time. We solicit presentations addressing the exploitation of ties between space techniques on ground, in space, and on the Moon, on exploitation of geometric, tropospheric and clock ties, on upcoming lunar missions and on corresponding requirements for future lunar missions in terms of definition and realization of lunar reference frames and time.

G01-2: International Terrestrial Reference Frame: Challenges, future developments and applications

Conveners: Mathis Bloßfeld

The Terrestrial Reference Frame (TRF) is fundamental to study and locate global phenomena or objects at the Earth's surface, in the ocean or in space. It realizes the metrological basis for multiple applications from sea level determination to navigation. We solicit presentations addressing the current status of the TRF and advancements in TRF realization, on methodologies for TRF combination and quality control, on metrology of space geodetic infrastructure, on challenges such as scale realization including GNSS, on the impact of geophysical models on TRF, on future developments and trends in realization of TRF as well as on applications of TRF such as precise orbit determination.

G01-3: Regional Reference Frames: Status, Challenges and Applications

Conveners: Fernand Bâle

Regional reference frames form the link for a consistent densification of the global reference frame to national reference frames, bringing the global reference frame to the user and also providing the metrological reference for monitoring regional deformations at high spatial resolution. We solicit presentations addressing current status and challenges of regional reference frames, regional geodetic infrastructure, methodologies for realizations of regional reference frames coping with deformations, realization of vertical reference frames, regional deformation and velocity fields, applications and services provided in the context of regional reference frames, interaction with UN-GGIM.

G01-4: The International Celestial Reference Frame for Geodetic Applications: Requirements, Challenges, and Future Prospects

Conveners: Maria Karbon

The International Celestial Reference Frame (ICRF) and the International Terrestrial Reference Frame (ITRF) and the link between them, expressed by the Earth Orientation Parameters (EOP), are key products of geodesy and astrometry. The demands on all components of this triad are increasing, as we face challenges like global change and its phenomena. To guarantee reliable observations of the System Earth the current goal of the astronomical and geodetic community is to reach a mm/uas level of accuracy on a global scale. This has not yet been archived. The component which might offer substantial potential to get closer to reach this goal is the ICRF. The current ICRS realization ICRF3 consists of three catalogues observed by VLBI at radio frequencies (8.4 GHz, 24 GHz and 32 GHz), and additionally one observed in the optical spectrum by Gaia. It forms the basis for monitoring the Earth's rotation and rotation variations with respect to inertial space, and therefore plays a central role in societal high-impact areas such as navigation and high-precision positioning in space and on Earth. We solicit presentations addressing current and future requirements for geodetic applications of the ICRF, methodologies for consistent realization of the ICRF, ITRF and EOP, comparison with the Gaia optical catalogue, challenges and future prospects such as the transition to VGOS, extension of catalogues to different frequency bands, impact and modelling of source structures. We want to showcase methods and works pursued in geodesy to reach the highest possible precision ICRF.