

# SnT 2023

CTBT: SCIENCE AND TECHNOLOGY CONFERENCE



Known formally as the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization, the CTBTO prepares for the Treaty's entry into force and builds up the CTBT verification regime to ensure no nuclear explosion can go undetected. This includes the International Monitoring System (IMS). As the seventh event in the CTBT: Science and Technology conference series, SnT2023 brings together well over 1000 scientists, technologists, academics, students and representatives of the CTBTO's policy making organ and subsidiary bodies. It is held from 19 to 23 June 2023 in the Hofburg palace, Vienna, and online. As part of this conference, the CTBTO invites interested participants to register to this public event.

## Public Event on Large Seismoacoustic Events The 2023 Türkiye-Syria Earthquake

On 6 February 2023, two powerful earthquakes rocked south-central Türkiye and northern Syria, strongly affecting the regions around Gaziantep, Kahramanmaraş, Malatya and Hatay. The epicenter of the first mainshock is located close to the East Anatolian Fault. The second large earthquake located 90 km north of the first mainshock on the east-west trending Sürgü Fault, occurred only 9 hours later at a time when the local population had already begun rescue operations. A basin-wide tsunami alert was issued by the North-Eastern Atlantic and

**19 TO 23 JUNE**

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Mediterranean Tsunami Warning System Service Providers. A small tsunami was generated by the earthquakes, which was measured in the eastern Mediterranean Sea.

The invited talk will present an overview on this dramatic earthquake sequence.

Invited talk: Cascading Multi-Segment Faults Triggered by Supershear Rupture During the 2023 South-East Türkiye Earthquake Doublet: A Giant Jigsaw Puzzle Mobilized

A devastating earthquake doublet occurred on 6 February 2023 with moment magnitudes of Mw 7.9 and Mw 7.7 along the East Anatolian Fault (EAF) and Sürgü-Çardak Fault (SCF), respectively. The 2023 earthquake sequence resulted in catastrophic human life and economic loss, and caused major impacts to infrastructure throughout south-east Türkiye and north-west Syria. The kinematics of ruptures for the doublet was complex involving multi-scale cascading rupture growth across the hybrid fault segments. We find that the first earthquake (Mw 7.9) nucleated on a previously unmapped fault, Nurdağı-Pazarlık segment, before transitioning to the EAF leading to supershear bilateral ruptures on the initial branch, Pazarlık and Erkenek segments and subshear rupture on the Amanos segment. The dynamic stress of the leading branch rupture impulsively triggered the EAF segments accelerating the following bilateral supershear rupture of the second earthquake (Mw 7.7) along the curved fragments of the SCF with dominant westward rupture directivity, and stopping instantly at geometric barriers at both ends of the fault. Hence, the geometry and pre-stress level of multiple segments heightened the diverse rupture characteristics of the 2023 south-east Türkiye earthquake doublet, contributing to the strong ground shaking and associated devastation and amplified the ground shaking intensity.

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Registration: Registration is required on <https://ctbto.org/SnT2023>. No registration fee will be charged.

Location: The SnT2023 venue is accessible via the Heldenplatz entrance of the Hofburg Palace.