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Preface

On February 1, 2002, Abdüllatif Aykut Barka passed away in İstanbul, Turkey. He was a scientist respected both in public and among Earth Scientists for the quality and depth of his research. Since his death, many have taken the opportunity to publicly and gracefully memorialise Aykut's contributions to science and life. Instead of replicating their words, we wish to use this preface and issue to highlight Aykut's contribution to geosciences via his work. We are grateful to Erdin Bozkurt for giving us, two of Aykut's close friends and colleagues, the opportunity to contribute to this issue. We also wish to thank the authors who volunteered to submit manuscripts when this issue was announced. We hope this issue is a fitting tribute to Aykut.

Aykut was not a typical friend, scientist or supervisor. As a distinguished authority on active tectonics, he was ahead of his time. Inspirational as a teacher and project supervisor, Aykut was also a tireless facilitator of international scientific collaboration and communication. Thus, he was well known by scientists all over the world studying active tectonics. Aykut's clarity of thought was reflected in his writing and speech. Through his countless contributions to Earth Sciences, he devoted enormous efforts to encouraging others to write down and publish their results. Aykut did what he thought was important and not what others believed, such as starting the annual meeting of the *Active Tectonic Research Group* in Turkey.

The nine papers in this special issue focus on Aykut's abiding interest in active tectonics, palaeoseismology and archaeoseismology. The first paper, by Westaway, highlights new evidence on the regional kinematics of the Middle East and Eastern Mediterranean and estimates the senses and rates of slip on major fault zones, which are consistent with both the GPS data and the available geological evidence. Westaway interprets the resulting pattern of regional deformation in terms of the kinematics of the brittle upper crust and mantle lithosphere and the relative horizontal motions between them, and discusses the implications of this new kinematic model for the dynamics of the region.

England compares the slip vectors and strain axes of earthquakes with geodetic strain measurements in the Aegean region and concludes that the tectonics of Greece, the Aegean Sea, and western Turkey are not dominated by rigid plates, but by the mechanics of a continuous medium responding to contrasts in its gravitational potential energy.

Lenk *et al.* describe the Turkish Permanent Global Positioning System Network (TPGN), which has been operating since 1999 in the Marmara region. They suggest that monitoring the Marmara region with the TPGN will provide information about abrupt changes

associated with earthquakes. They analyse data collected from 18 August 1999 to the end of 2001 and demonstrate and interpret preliminary results of inter-seismic velocities of TPGN stations in the Marmara region.

Koçyiğit & Özacar utilise evidence from the NE edge of the well-known Isparta angle, which is one of the most complicated neotectonic structures in Turkey and was previously interpreted as a compressional feature. They interpret new field data in the light of seismic data obtained from very recent seismic events, the 15 December 2002 Sultandağı (Afyon) and the 2 February 2002 Çay earthquakes, and conclude that the NE edge of the Isparta angle is an active oblique-slip normal fault.

Çakır *et al.* investigate the stress changes caused by the İzmit event on the Düzce rupture and the stress changes around the Sea of Marmara prior to the İzmit event. They conclude that the İzmit earthquake promoted the 12 November 1999 Düzce earthquake by raising the static stress on the Düzce rupture over 5 bars. They also conclude that, in the Marmara region, static stress has increased over 5 bars since 1912 due to large earthquakes. This increase corresponds to an increase normally accumulated in about 12 years by secular loading due to the continuous plate motion; that is, the previous earthquakes brought forward the next earthquake in the Sea of Marmara by 12 years.

In another paper, **Çakır** *et al.* map the coseismic deformation field of the Düzce earthquake using synthetic aperture radar interferometry (InSAR). They model the geodetic observations with a linear inversion technique and conclude that the Düzce earthquake might have been associated with multiple fault breaks involving a near-vertical Düzce Fault and a reactivated old thrust fault that dips to the north. They also conclud that both the GPS and InSAR data suggest a longer fault rupture to the east that is, the eastern end of the Düzce rupture extends about 15 km further east at depth.

Hitchcock *et al.* study the palaeoseismology of the Düzce Fault and the connection between the Düzce Fault and the southern branch of the North Anatolian Fault System west of Bolu. They conclude that the earthquake recurrence interval on the Düzce Fault ranges from 300 to 800 years. Based on mapping and palaeoseismic data, they conclude that the southern and northern strands of the North Anatolian Fault System are structurally and kinematically linked in the vicinity of Bolu by active secondary faults, including the Elmalık and Bakacak faults.

Altunel *et al.* study faulted archaeological relics at the ancient city of Cnidus in southwestern Turkey and they conclude that the geological and archaeological evidence points to at least two major seismic events affecting the site. The first event, around the late Hellenistic period (2^{nd}-3^{rd} century BC), caused the destruction of the original Round Temple and of a temple in the Sanctuary of Demeter. The second event involved surface rupture of the Cnidus Fault in the 5^{th} century AD and was responsible for the dislocation of the replacement Round Temple and the later walls of the Sanctuary of Demeter.

Kontogianni & Stiros examine earthquake damage on tunnels, including the Bolu twin tunnels, which were damaged by the 1999 Düzce earthquake, and conclude that tunnels cannot be considered as structures invulnerable to earthquakes. They also conclude that certain observed seismic surface ruptures are not necessarily indicative of tectonic faulting and represent only secondary local ground instability effects.

Aykut made important and lasting contributions to the study of active faulting in Turkey. He always defended the idea that studying active faults requires the incorporation of allied disciplines such as seismotectonics, morphotectonics, palaeoseismology, archaeoseismology, remote sensing, space geodesy and modelling. This issue includes work on various disciplines in active tectonics from field observations to modelling. Thus, this issue hopefully meets Aykut's expectation that good science involves drawing upon the allied disciplines in active tectonics.

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