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The 2001 $M_w = 6.4$ Skyros earthquake, conjugate strike-slip faulting and spatial variation in stress within the central Aegean Sea

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Abstract

This paper uses the seismological data provided by analysis of the July 26, 2001 Skyros earthquake ($M_w = 6.4$) aftershock sequence to discuss various models for Quaternary deformation of the central Aegean region. In particular, it is suggested that the left-lateral Skyros fault is a primary strike-slip fault formed in Early Quaternary times and striking perpendicular to the right-lateral North Anatolian Fault (NAF). This fault blocks linkage between normal faults offshore Evia Island and NAF. The fault kinematics, stress transfer analysis and available focal mechanisms indicate that the stress field is characterized by a switch between vertical σ_2 and vertical σ_1 with σ_3 trending roughly $N10^\circ E$. The spatial variation of the stress field is imposed by the N–S, extensional strain due to conjugate strike slip faulting. The variation in stress defines a 170 km wide area from $23^\circ E$ to $25^\circ E$ comprising the terminating influence of the 1200 km long North Anatolian Fault on to the north-central Aegean crust.

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1. Introduction

On July 26, 2001 at 00:21:39 GMT a strong earthquake of magnitude $M_w = 6.4$ hit the central Aegean Sea (Fig. 1; Melis et al., 2001; Drakatos et al., 2004; Roumelioti et al., 2004). This earthquake occurred along a NW–SE, left-lateral fault, offshore Skyros Island (Fig. 1; Benetatos et al.,

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