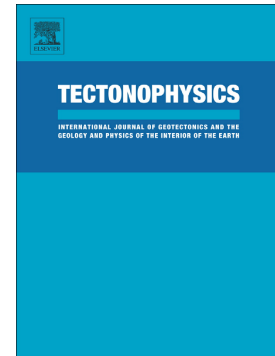


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## The 2017 Mw 7.3 Sarpol Zahāb Earthquake, Iran: A Compact Blind Shallow-Dipping Thrust Event in the Mountain Front Fault Basement

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**Abstract:** The 12 November 2017 Mw 7.3 Sarpol Zahāb earthquake is one of the largest events to have occurred in the north-western Zagros fold-and-thrust belt during the instrumental period. We use teleseismic and synthetic aperture radar data to study the earthquake source parameters, rupture process and active tectonic characteristics of the event. We find that both data sets individually produce remarkably similar slip distribution, indicative of buried faulting that is consistent with the lack of significant surface rupture. Through the joint inversion of satellite radar and teleseismic data, we find that the rupture propagated rapidly ( $\sim 3.2$  km/s) and asymmetrically along strike to the south, but relatively slowly ( $\sim 1.5$  km/s) in the updip direction, and formed a single large-slip asperity with a peak slip value close to 5 m. Given the regional tectonic context of the distribution of known faults and lithologies, we suggest that the maximum slip is either located in the lowest sedimentary cover or the uppermost basement of the Mountain Front Fault.

### 1 Introduction

As one of the most seismically active thrust zones (Vernant et al. 2004), the Zagros fold-and-thrust belt (ZFTB) extends from western Iran to northern Iraq for  $\sim 1500$ -km-long. The ZFTB accommodates one third of the total N-S Arabia-Eurasia continental collision rate (30

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