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INTERSEISMIC SLIP-RATE OF THE KUHBANAN-LAKAR KUH FAULTS SYSTEM: USING INSAR TECHNIQUE

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The Kuhbanan fault with ~ 300 km length, one of the largest seismogenic faults in the southeast of Iran, has caused several catastrophic earthquakes with M_s 5-6.2 in 20st-21st centuries (Table 1). Moreover, the corresponding cross-thrusts were also associated with at least five clusters of medium-magnitude earthquakes. The Lakar Kuh fault with ~160 km length run parallel to the Nayband fault (Figure 1). The slip-rate of faults and also the spatio-temporal distribution of large-magnitude shallow-depth earthquakes on the Kuhbanan-Lakar Kuh fault system, attain broad concern for seismic hazard assessment (Figure 1). The horizontal slip-rate of the Kuhbanan fault is estimated ~1–2 mm/yr (Walker et al., 2012). Furthermore, the total horizontal displacement of the fault is reported ~5–7 km, as determined by the offset geological markers (Table 2).

Table 1. Historical and instrumental earthquakes with Magnitude ≥5 on the Kuhbanan-Lakar Kuh fault system (Ambraseys & Melville, 1982).

	Earthquakes				
Fault	**Date**	**Time(UTC)**	**Magnitude**	**Location**	**References**
Kuhbanan	November 1854		5.8 M_S	Horjand	Ambraseys & Melville, 1982
	17 January 1864		6 M_S	Chatrud	
	4 August 1871		5 M_S	Chatrud	
	May 1875		6 M_S	Kuhbanan	
	22 May 1897		5.7 M_S	Kuhbanan	
	27 may 1897		5.5 M_S	Kerman	
Lakar Kuh	18 April 1911		6.2 M_S	Ravar	
	12 December 2017	08:43:17	6.2 M_W	55 km North-east of Kerman	IIEES

In this research, we constrain the geodetic slip-rates of the Kuhbanan-Lakar Kuh fault system in the north of Kerman. We used the Synthetic Aperture Radar Interferometry (InSAR) technique, to estimate the geodetic slip-rate of the faults. For this purpose, the interseismic activity between the major mainshocks of 1/12/2017 with M_s 6 and 27/12/2017 with M_s 5 (IIEES) was investigated (Table 1). Both mainshocks occurred on shallow reverse faults, associated with conjunction of the southern termination of the Kuhbanan and Lakar Kuh faults (Savidge et al., 2019). The rupture in both earthquakes

extends more significantly along the fault strike than the fault dip, hinting structural or stratigraphic controls on the rupture dimensions. In this study, six radar images in ascending and descending orbits of the Sentinel-1 satellite (from 25.1.2017 to 22.1.2018) were used to determine the slip-rate of the southern termination of the Kuhbanan and Lakar Kuh faults. According to this research, the horizontal slip-rate of ~3.5 mm/yr and the vertical slip-rate of ~1-2 mm/year is suggested for the Kuhbanan fault. In addition, the vertical and horizontal slip-rate of Lakar Kuh fault is estimated ~1.5-2 mm/yr and ~2.5-3 mm/yr, respectively.

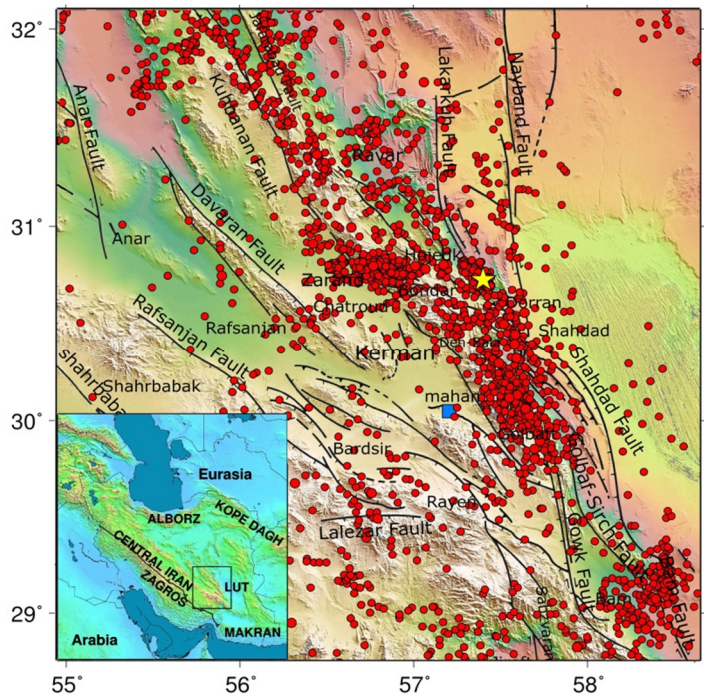

Figure 1. Earthquakes distribution map showing earthquakes (Magnitude ≥ 2.5) occurred in north of Kerman province (The star is indicative of the December 2017 Hojedk earthquake).

Table 2. Slip-rate and length of the Kuhbanan and Lakar Kuh fault. Abbreviations: (H) Horizontal, (V) Vertical.

Fault	Length	Slip-rate(mm/yr)		References
		Geodetic	Geology	
Kuhbanan	~ 300 km		2-1.4 ± 0.1	Shafiei Bafti et al., 2009
			~1–2	Walker et al., 2012
		3.6 ± 1.3		Walpersdorf et al., 2014
		~3.5 (H) , ~1-2 (V)		This study
Lakar Kuh	~160 km	~2.5-3 (H) , ~1.5-2 (V)		This study

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