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Measurement of interseismic strain accumulation across the Haiyuan fault by InSAR using ERS and Envisat data.

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The Haiyuan fault system is a major left-lateral fault located at the northeastern edge of the Tibet- plateau and at the origine of two M8 earthquakes (1920 and 1927). Between the two ruptures a seismic gap ("the Tianzhu seismic gap") with a high potential hazard has been identified. We first used the ERS archive to better constrain the present day mechanical behavior of the fault by InSAR. The ERS images has been acquired between 1993 and 1998 from descending orbits, along two adjacent tracks ranging between longitudes 102.6E and 105.3E and latitudes 36N and 38N. Interferogram are first jointly corrected from the residual orbital error and the tropostatic delay, mainly due to the variation of the water vapor vertical stratification between two satellite passes. We then analysed noise spectra of corrected interferograms and select the interferograms presenting the best signal to noise ratios. We finally derived average velocity maps showing a steep velocity gradient, a few kilometers-wide, across the fault, compatible with left-lateral motion. Inversion of stacked data in the two tracks, using a screw dislocation model in an elastic half space, indicates an average fault-parallel velocity of 6.3 mm/yr (4.2-8 mm/yr) consistent with GPS data, and a small apparent locking depth of about 1.7 km (0-4.2 km). This may be indicative of the existence of superficial creep or of a compliant zone around the fault. To increase the observation temporal window, we add the Envisat ascending and descending data (and ERS2 images acquired during the period 2003-2007) in our analysis. The goal is to confirm the mechanical behavior of the fault observed between 1993 and 1998. Using

the recent ERS2 images, we also want to establish the deformation time series and compare it with the previous result obtained from a simple data stack.