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Surface deformation associated with the Al Hoceima (Morocco) earthquake (Mw 6.4, 24/02/04) deduced from InSAR: implications for the active tectonics along North Africa

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We study the surface deformation associated with the Mw 6.4 February, 24 2004 Al Hoceima earthquake that affected recently the Rif Mountains. Thrust-and-fold structures of the Rif Mountains developed during the Tertiary period but the recent significant seismic events and late Quaternary deformation indicate east-west extension accommodated by north-south to NNE-SSW trending fault system. This active deformation illustrates the fragmentation of the Rif Mountain range that is likely due to the Africa-Iberia collision tectonics and WSW trending escape tectonics. No clear surface rupture was observed during the field investigations carried out after the earthquake. To map the surface displacement field, numerous interferograms were constructed from the European Space Agency's Envisat satellite images in both ascending and descending modes. Preliminary analysis and modeling of these interferograms suggest that the earthquake is associated with a NW-SE trending righ-lateral blind strike-slip fault, consistent with the focal mechanism of the mainshock and distribution of aftershocks.