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Field test campaign in the Morocco desert as analog for the DREAMS experiment on board ExoMars 2016 mission

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We present the preliminary results of an extensive field test campaign devoted to the study of dust lifting mechanisms and their effect on atmospheric electric field. The main objective is to quantify the effect of fresh lifted dust on the atmospheric electric field and its feedback on the lifting process. An enhancement of the atmospheric electric field is expected during dust events such as sand saltation process, dust devils, dust storms (e.g Schmidt et al., 1998; Kok and Renno, 2006; 2008). This is due to charge transfer among particles during sand-dust-soil collisions. This mechanism is poorly understood but from some laboratory and field experiments, we expect that saltating sand particles charge negatively while the soil surface charges positively, so that the resulting electric field is expected to be reversed in sign with respect to fair weather. Moreover, some studies show also evidences of the role of electric field in reducing the wind stress needed to start sand saltation process (Kok and Renno, 2008; Zheng et al., 2003; 2006). We acquired synchronized measurements of wind speed and direction, atmospheric pressure, solar radiation, air and soil humidity and temperature, wind erosion using impact sensors and sand catchers, dust lifting and electric field for about two months in the Moroccan desert. Preliminary data analysis shows a strict correlation between the abundance of the fresh lifted dust and the enhancement of atmospheric electric field. This study provides new evidences in the relation of aeolian processes and electric properties of the atmosphere and will prepare the analysis of the data that will be acquired on Mars by the instrument DREAMS onboard the ExoMars 2016 space mission. DREAMS is a meteorological station with the additional capability to perform measurements of the electric field close to the surface of Mars.