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Laser diffraction granulometry of carbonate cataclastic rocks: impact of analytical procedures on particle size distributions

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Particle size distributions provide first order data to rock characterization and to the description of many geological processes including sedimentation, rock fragmentation and soil formation. Laser diffraction granulometry provides the possibility of fast particle size data acquisition over a wide size range by using a variety of analytical methods. They ensure the appropriate flexibility for analysing very different granular materials, but deserve accurate investigations and systematic testing for the possible influence that different analytical methods may exert on results obtained by the same or different instruments. We present results from specific tests on poorly coherent carbonate platform fault core rocks by using two different instruments with different sample dispersion and pumping systems. Most of our analyses were performed with a Malvern Mastersizer 2000 laser diffraction granulometer that allowed us to apply several wet and dry analytical procedures at different pump speeds, which included measure precision tests with and without sample ultrasonication, different dispersant liquids, and sampling precision tests. Unfaulted quartz-rich eolian sands were also analysed for comparative purposes. Results of our work indicate a significant sensitivity of particle size data to the rock type and the adopted analytical procedure.