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Modelling the evolution of natural cliffs subject to weathering: II. Discrete elements approach

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The evolution of slopes subjected to weathering has been modelled by assuming Mohr-Coulomb behaviour, and by using a numerical approach based on the Distinct Element Method. According to this method, soil/rock is represented by an assembly of bonded particles. Particle bonds are subject to progressive weakening and so the material weathering and removal processes are modelled. Slope instability and material movement follow the decrease of material strength in space and time with the only assumption concerning the weathering distribution within the slope.

Firstly, the case of cliffs subject to strong erosion (weathering-limited conditions) and uniform weathering was studied to validate the DEM approach by comparison against analytical predictions from limit analysis (see companion abstract). Secondly, transport-limited slopes subject to non-uniform slope weathering were studied. Results have been compared with experimental data and other geomorphologic models from the literature [Fisher-Lehmann, Bakker-Le Heux].