

# Evolution of the deformation band in the numerical sandbox experiment with 2.4 billion DEM particles

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We modeled a deformation mechanism of an accretionary prism using the numerical simulation of the sandbox experiment. We solved the motion of 2.4 billion solid particles with Discrete Element Method (DEM) on massively parallel supercomputer system. This huge number of particles enabled us to use the realistic parameters of the sand. Thus, we could successfully reproduce the prism evolution which was consistent with the lab sandbox experiment. One of the advantages of numerical simulation over the analog experiment is the ability to analyze the detailed deformation processes of the granular layer in 3D. We analyzed the mechanical state of particles inside the deformation band to reveal the relations between the growth mode and the wavelength of the deformation. From the results, we discuss the characteristic length to change the deformation mode between the discrete and continuous behaviors.

Keywords: accretionary prism, sandbox, DEM