The friction and rheology virtual test for volume roughness and asperity contact zone relatively motion

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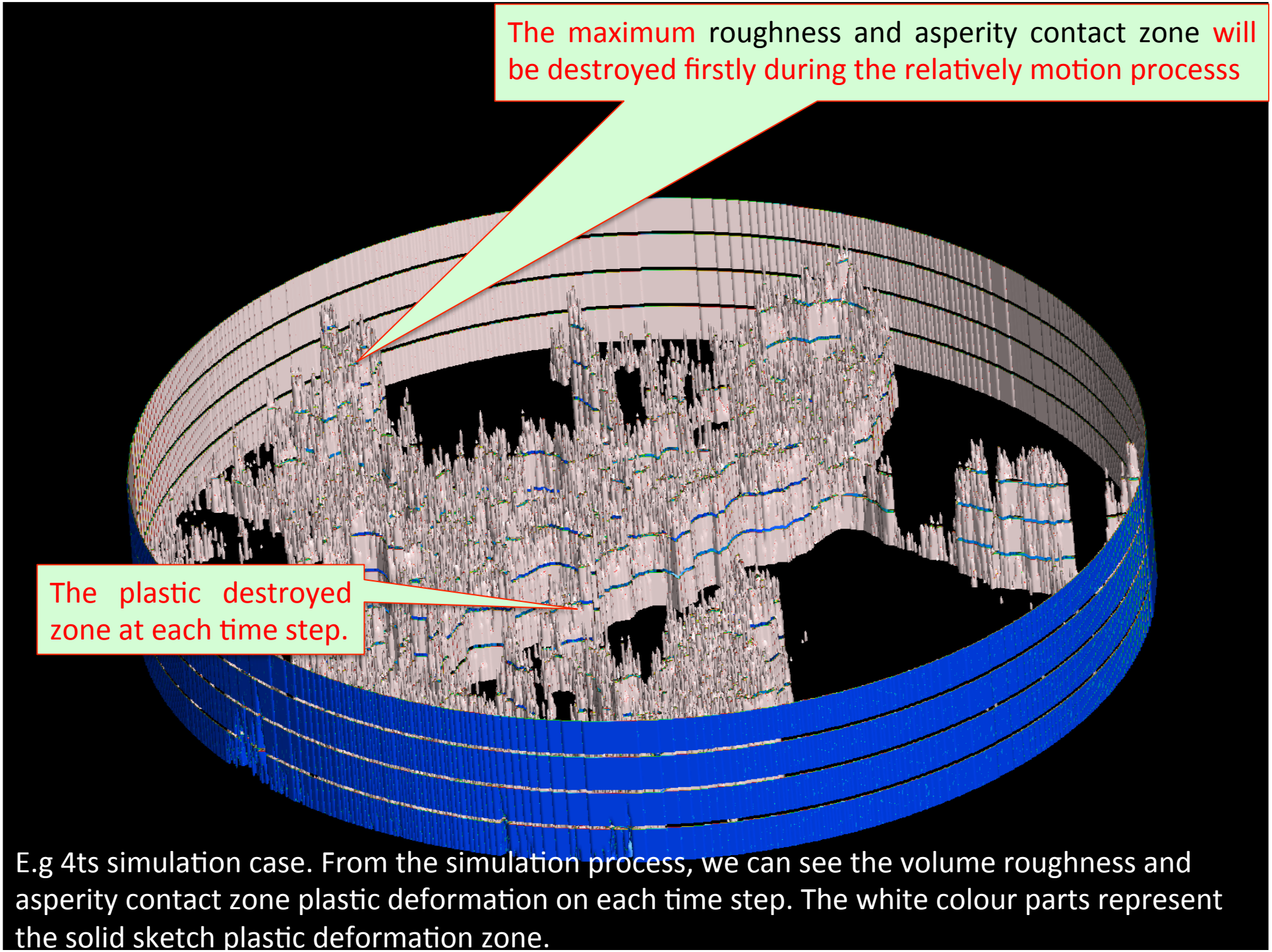
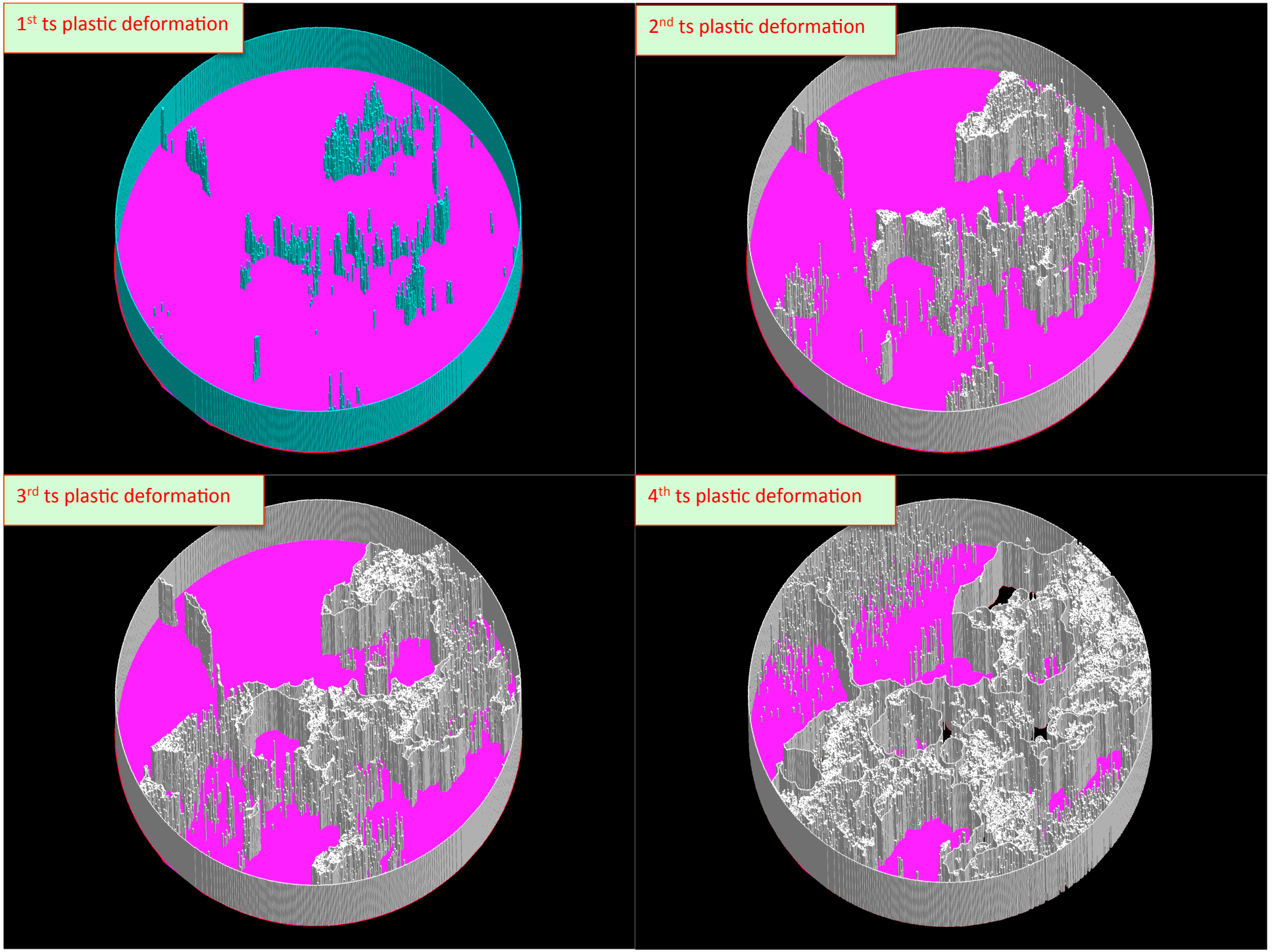
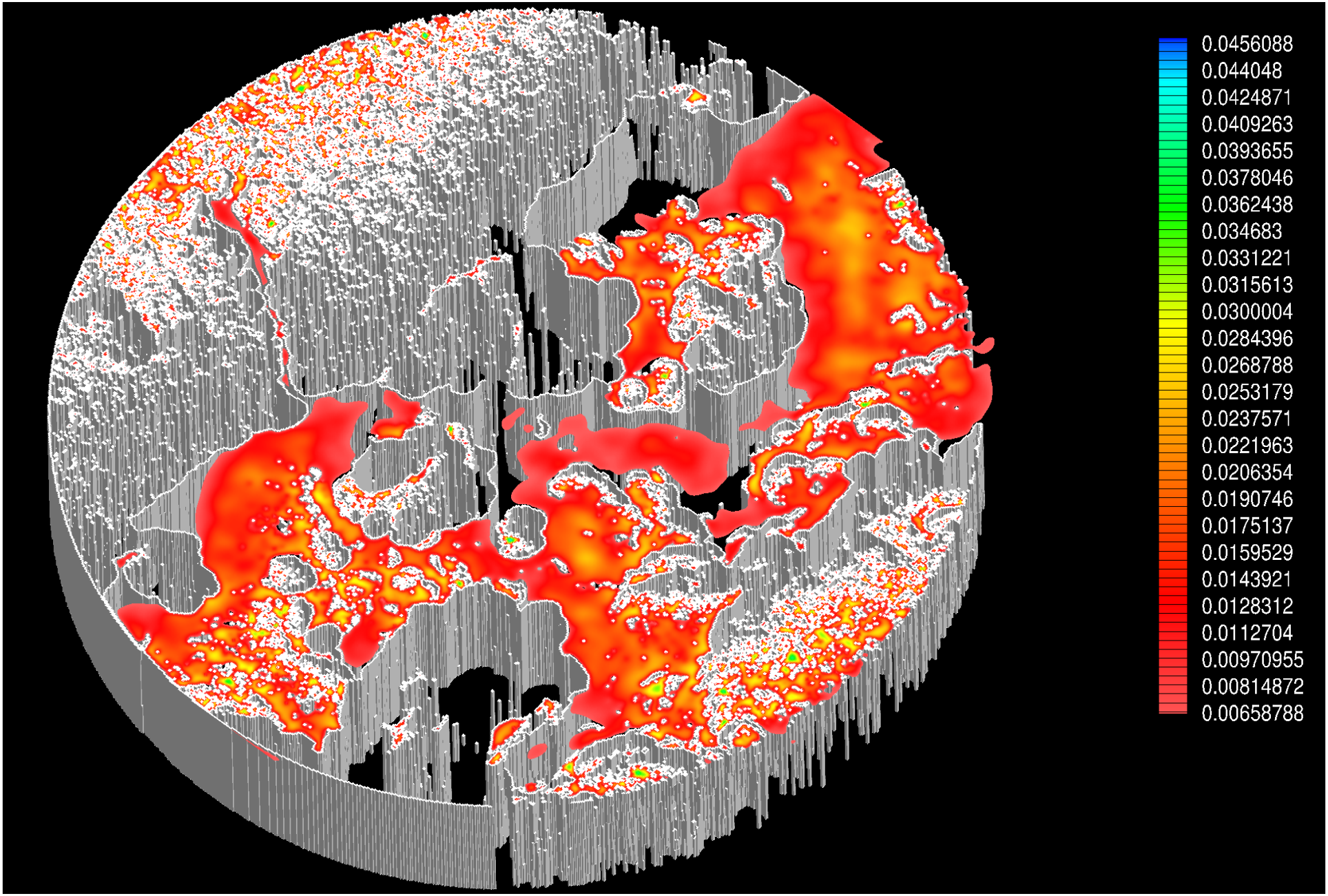
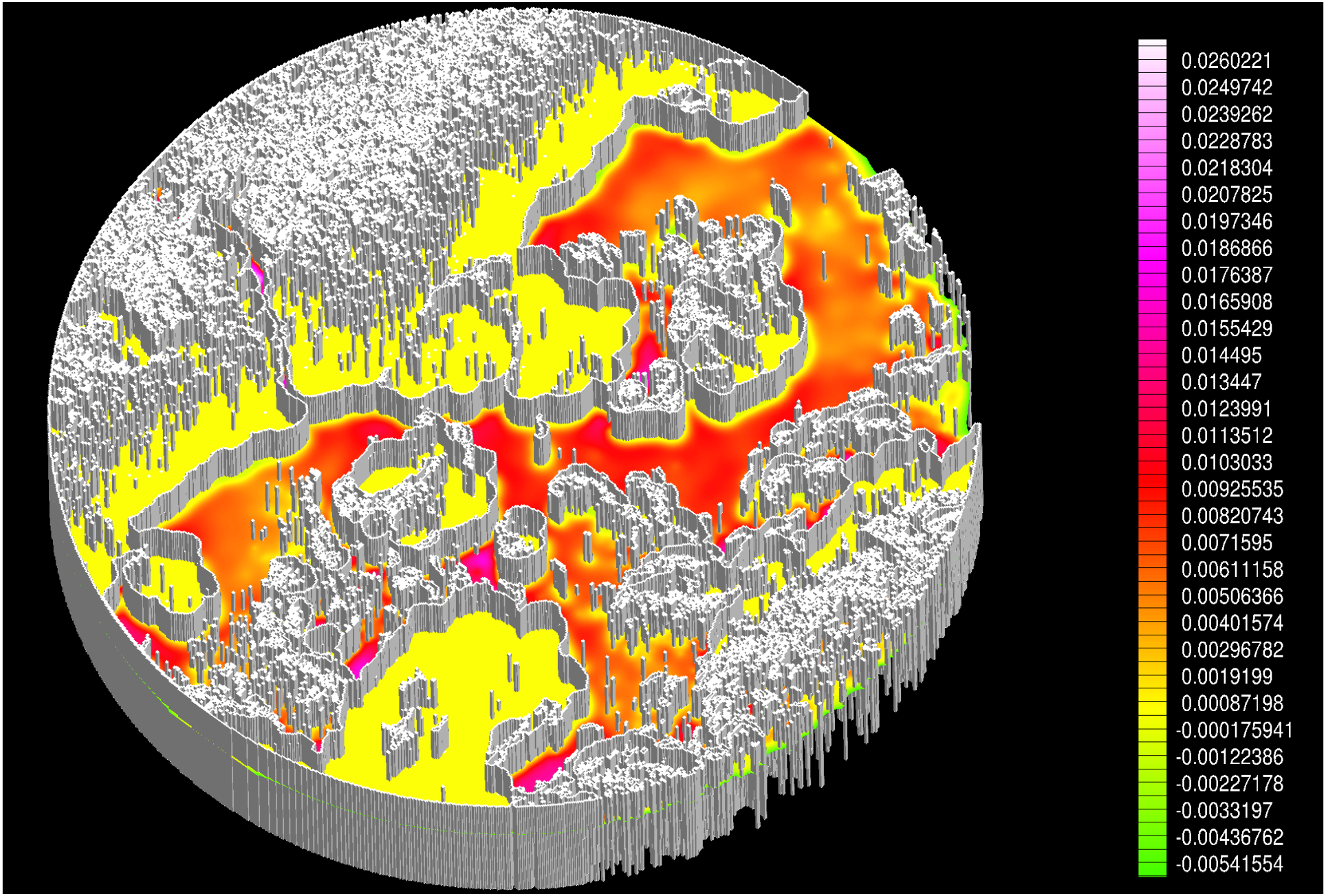


E.g 4ts simulation case. From the simulation process, we can see the volume roughness and asperity contact zone plastic deformation on each time step. The white colour parts represent the solid sketch plastic deformation zone.

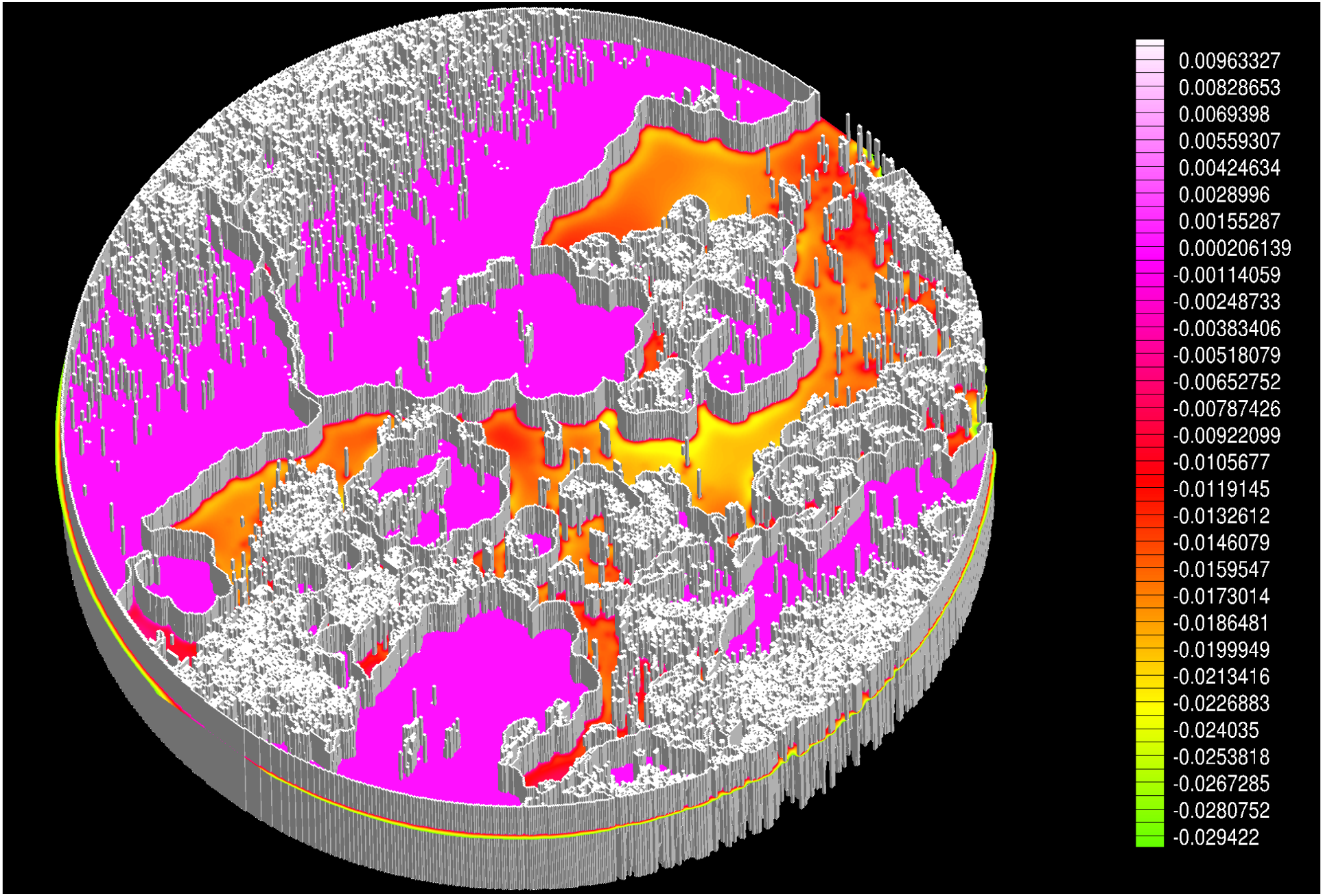

1st ts plastic deformation
2nd ts plastic deformation
3rd ts plastic deformation
4th ts plastic deformation



4 ts strain rate distribution as function of position in the volume roughness and asperity contanct zone

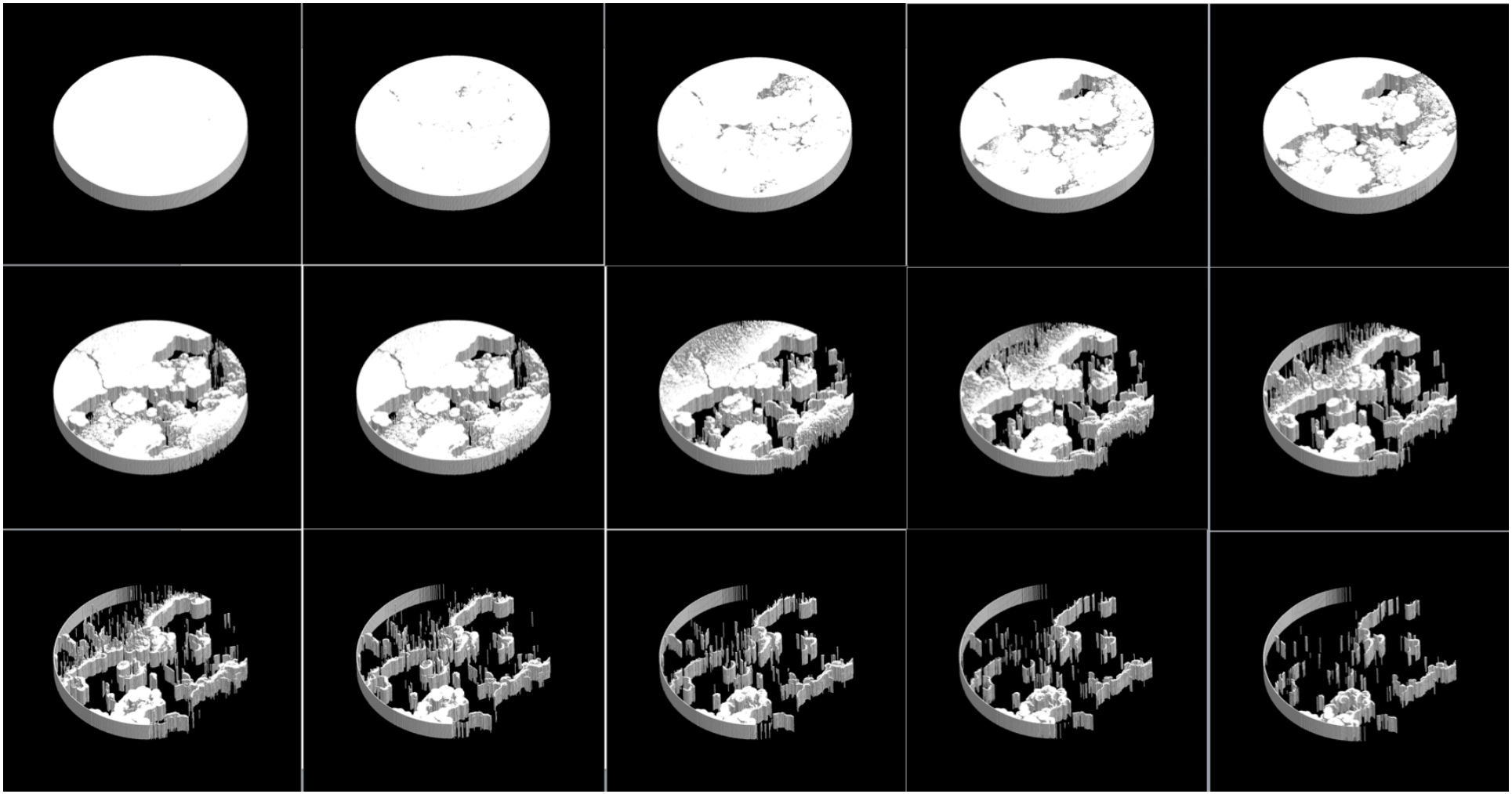


14 ts strain rate distribution as function of position in the volume roughness and asperity contanct zone



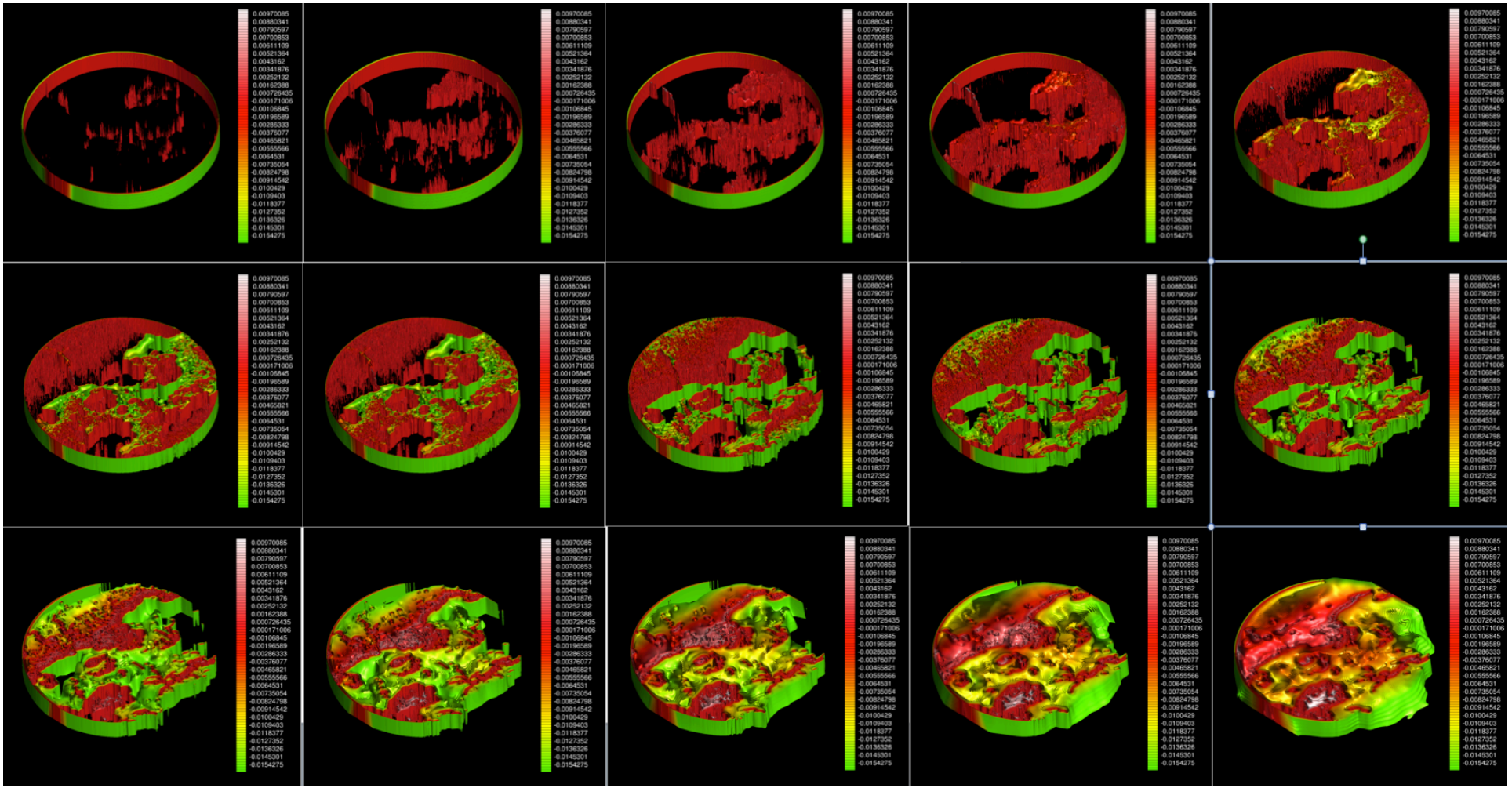
24 ts strain rate distribution as function of position in the volume roughness and asperity contanct zone

Virtual test principle slip surface plastic-creep deformation process



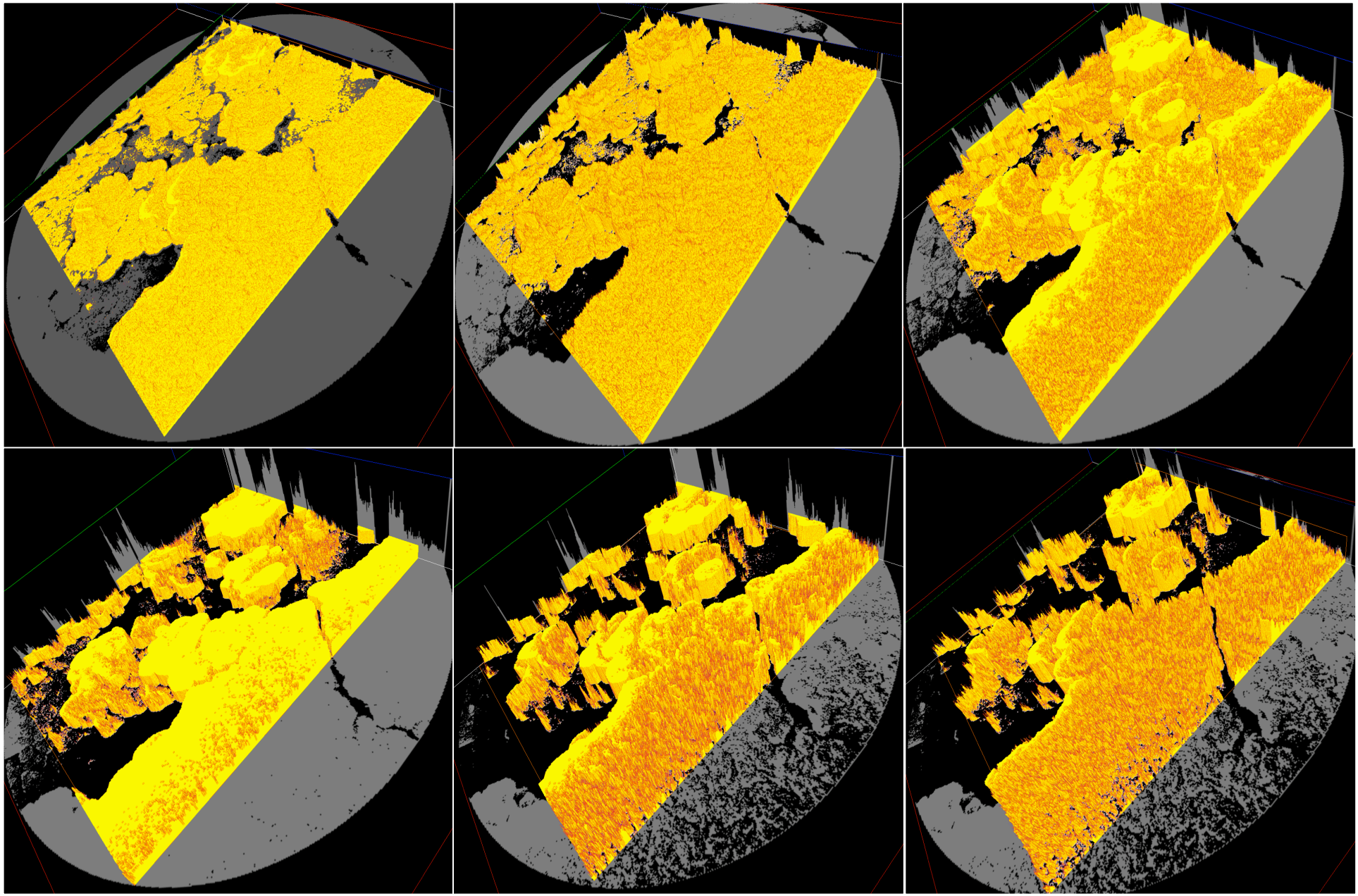
During the relativity motion late process, the solid-sketch asperity contact area is torn from the principle slip surface; the rheological properties play a leading role in the post-stage of flash heating process.

Virtual test principle slip surface slip rate distribution as function of geometry structure



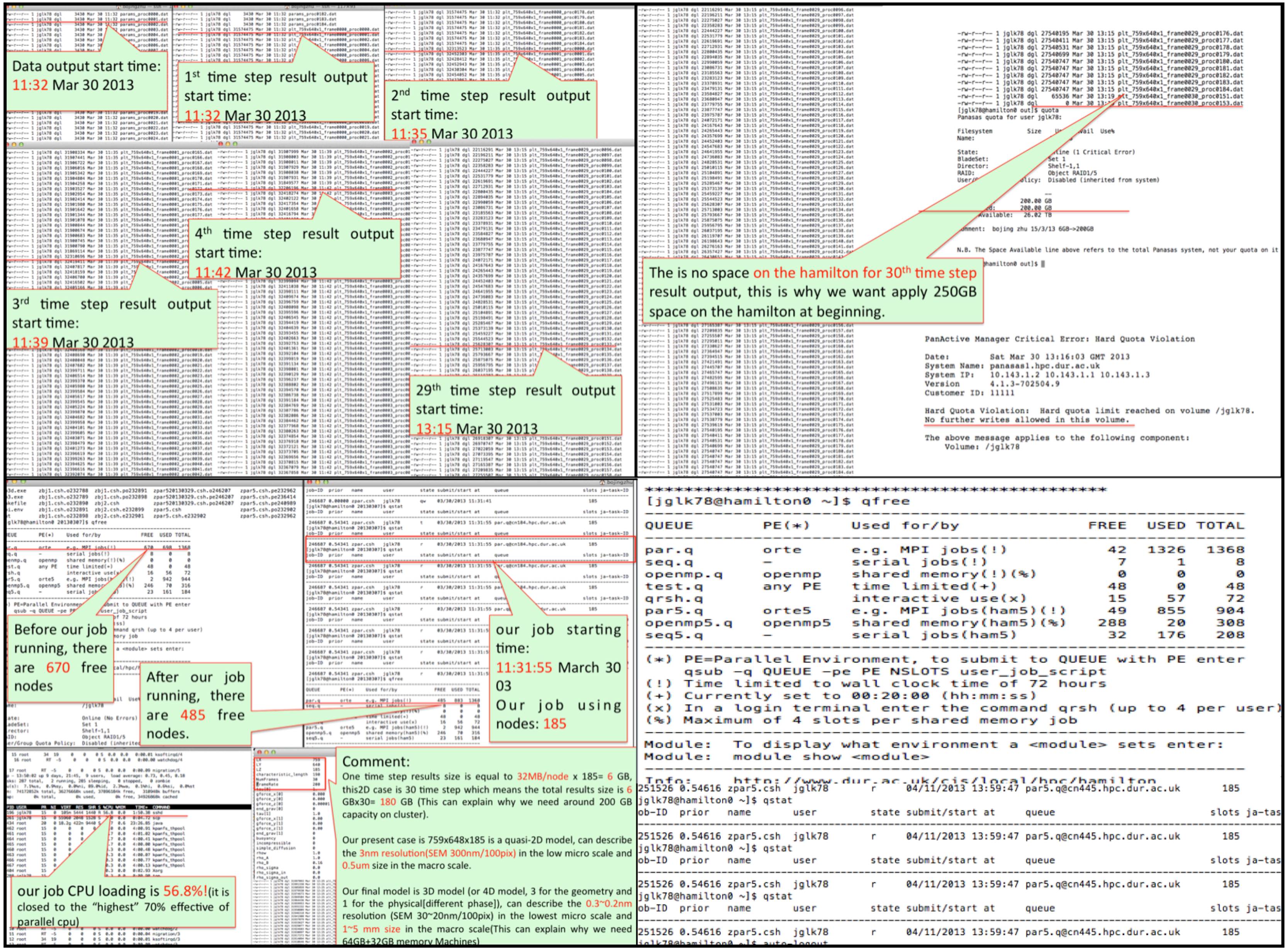
With the slip time increasing, the solid sketch zone(the volume roughness and asperity contact zone) on the principle slip surface is located on the visco-plasto-creep state (the friction heating)

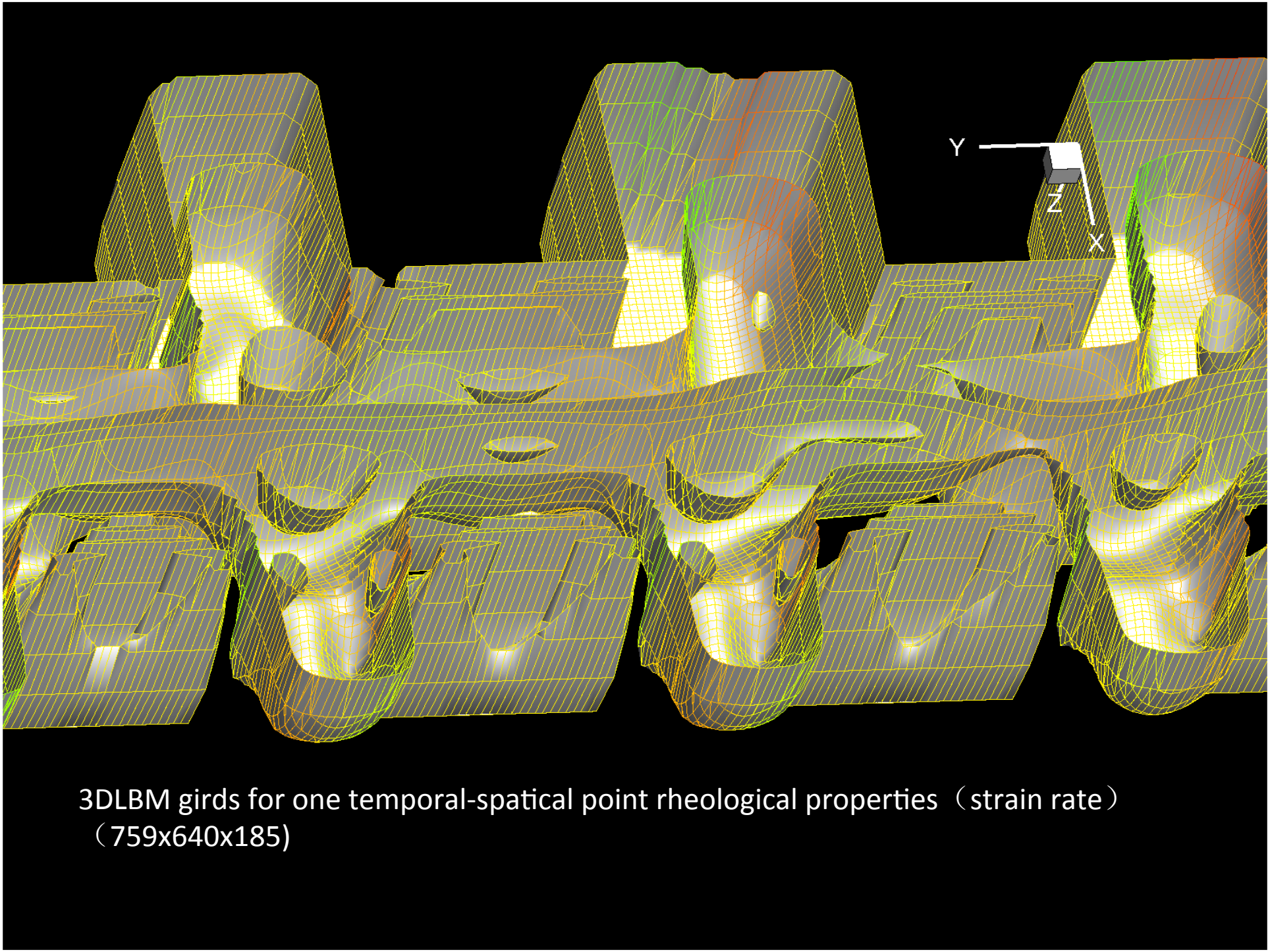
Virtual test rheological properties on the PSS during flash heating process



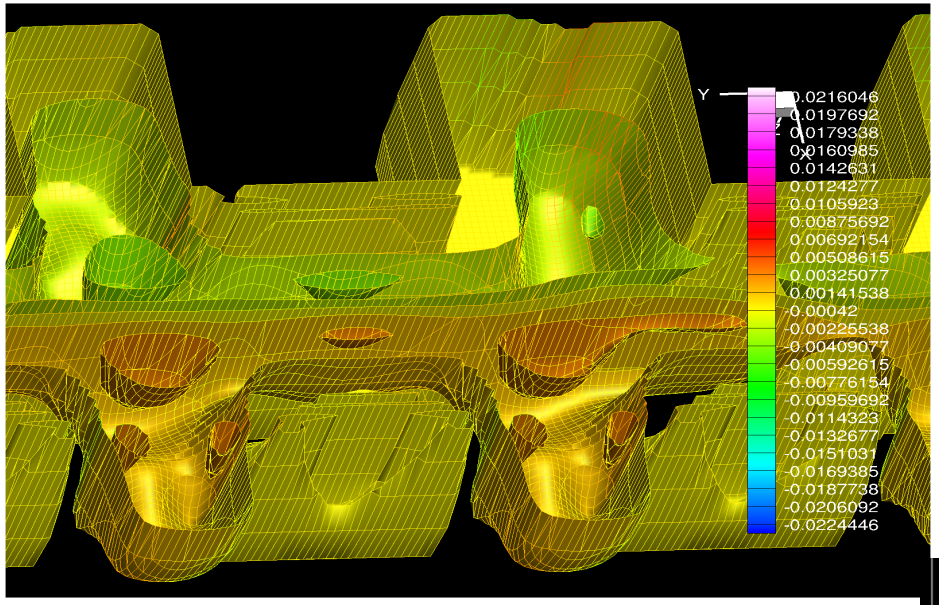
Virtual test environments(3DLBM+HP cluster)

Model size：759x640x185; parallel condition:5920 core；parallel effective 59%





3DLBM girds for one temporal-spatical point rheological properties（strain rate）
（759x640x185)



Strain rate contour

Rheological strain rate tensor