# $\langle$ Previous 9 of 17 Next $\rangle$ $\times$ (i

## **Abstract Details**

## <u>AOGS 1st Annual Meeting</u> > <u>Natural Hazards</u> > A CSPH method for the Simulation of Free S Flows >

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### Abstract:

This paper presents a mesh-free methodology based in the shallow v equations for the simulation of geophysical flows[1]. The resulting eq treat the continuum as a Hamiltonian system of particles where the constitutive equation of the continuum is represented via an internal term. In the case of fluids, the internal energy term is a function of the density, which for shallow waters becomes a function of the depth of layer. Once the internal energy terms are established the equations o motion are developed as equations of Lagrange, where the Lagrangia coordinates are the current position of the particles. Since the energy are independent of rigid body rotations and translations, this formula ensures the preservation of physical constants of the motion such as and angular momentum. Using the variational formulation of SPH equ [2], a novel formulation of the Shallow Water Equations is introduced SPH). The resulting methodology allows for the simulation of flows ov general topography and the simulation of debris flows and avalanches complex terrains such as volcanoes. Some examples are presented st the capabilities of the new methodology, including flows on regular geometries and flows on general terrains. Some computational aspect the implementation of the SW-SPH method are also addressed.

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