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Rapid flow-like landslides: innovative approaches for risk mitigation

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Fast landslides, like flow slides, debris flows and rock avalanches, are mainly triggered by sudden events such as heavy rainstorms and seismic actions and are characterized by (i) the absence of evident warning signals, (ii) huge volumes involved, (iii) large propagation velocities and (iv) long distances travelled. Climate change effects, in Italy and globally, have further increased risks related to such phenomena which can cause not only severe damages to structures/infrastructures but also a large number of casualties. For this reasons, a large volume of scientific publications has been produced by studying the three key phases of a landslide phenomenon: inception, propagation and arrest (deposition/interaction with structures).

Nevertheless, due to the problem complexity (associated with the presence of hydro-mechanical coupling, high dynamicity and large displacements) it is still challenging to (i) define a clear theoretical framework, (ii) fine-tune methods for modelling the entire landslide process and (iii) develop reliable tools to design risk mitigation measures. In this presentation I will show and critically discuss the results of my research aimed at conceiving innovative approaches for risk mitigation by means of advanced computational tools. I will also discuss the steps towards a unique framework developed to simulate the entire landslide process, from inception to arrest.

Irene Redaelli holds a PhD in Structural, Seismic and Geotechnical Engineering from Politecnico di Milano in 2016 where she currently works as Post DoC and adjunct professor in Geotecnics. She dedicated her research to advanced modelling of landslides contributing to a wide range of national and international research projects.