Topic 1. Landslides in a changing climate

The ideal candidate has a project proposal to explore the role of climate change on landslides (and, more broadly, natural hazards) in study areas of their choice (where data are available to them) by means of either physically-based modelling or physics-informed data-driven approaches at various scales: from individual slopes to catchments and entire orogens. The candidate should bring a fresh, original perspective rather than proposing applications or incremental refinements of existing methodologies. Our interest lies primarily in thermal effects, but ideas are welcome for accounting for diverse coupled processes into the picture (hydro-mechanical, thermo-hydro-mechanical, chemo-mechanical processes, etc.). Also, multidisciplinary studies are encouraged, where societal aspects are also considered so as to quantify risk (not only susceptibility and hazard) and propose risk reduction strategies.

Topic 2. Chemo-mechanics of clay landslides and engineered clay barriers

The ideal candidate plans experimental campaigns and/or constitutive modelling of clay soils accounting for chemo-hydro-mechanical coupling. We are especially interested in how the exposure of clays to salt solutions, acids and bases, and organic compounds can temporarily or permanently alter the hydraulic and mechanical behaviours of clay soils, with possible applications in slope stability/landslide stabilisation and/or engineered clay barriers. The candidate should propose their own original experimentation or a novel modelling strategy. It is not a must, but it is desirable for the candidate to have the skills to explore the full thermo-chemo-hydro-mechanically coupled response of soils.