


# Numerical Rock-Glacier Flow via the Pressure Method

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Recent literature confirms the crucial influence of non-viscous deformations together with temperature impact on glacier and rock glacier flow numerical simulation. Along this line, supported by the successful test on a one-dimensional set-up developed by two of the authors [2], we propose the numerical solution of a two-dimensional rock-glacier flow model based on an ice constitutive law of second grade differential type [1]. The procedure adopted uses a 2nd order finite difference scheme and imposes the incompressibility constrain up to computer precision via the pressure method, extended from newtonian computational fluid dynamics. The governing equations are solved in primitive variables with the advantage to avoid pre-/post-processing; splitted solution of the derived Poisson equation for pressure, source of undesired numerical mass unbalancing, is avoided as well. Numerical results will be shown. The financial support of Piano Nazionale Ricerca Antartide (project PNRA16-0012) is acknowledged.

## References

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- [2] Kannan, K., Mansutti, D. and Rajagopal, K.R.: Computational corroboration of the flow of rock glaciers against borehole measurements. *Int. J. Non-lin. Mech.*, **132**, 103710 (2021)

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