

Cioni, R., Andronico, D., Cappelli, L., Aravena, A., Gabellini, P., Cristaldi, A., Corsaro, R.A., Cantarero, M., Ciancitto, F., de Beni, E., and Ganci, G., 2023, Products and dynamics of lava-snow explosions: The 16 March 2017 explosion at Mount Etna, Italy: GSA Bulletin, <https://doi.org/10.1130/B37102.1>.

Supplemental Material

I. Item S1

List of websites hosting the three videos discussed in the text (all accessed 13 August, 2023).

Magri, E. (via Storyful; 16 March, 2017). Explosion at Mount Etna Injures Ten [Video]. YouTube. <https://www.youtube.com/watch?v=nOCzy0zhano>

Martin, A. (17 March, 2017). Mount Etna Eruption March 16th 2017 Escape Run [Video]. YouTube. <https://www.youtube.com/watch?v=1F3CxOmnKhs>

Morelle, R. (16 March, 2017). Mount Etna: BBC crew caught up in volcano blast. BBC News [Video]. <https://www.bbc.com/news/world-europe-39293086>

II. Item S2

UAS video footage of the lava flow and the deposit of the explosion [SuppVid1.mp4]

III. Figure Captions

Figure S1. (a-e) Burns on the clothes of some of the people affected by the incandescent fallout. (f) Lahar/muddy ash deposits which formed during or few minutes after the explosive sequence, suggesting the formation and thus the availability of a large amount of water due to snow melting by the lava flow. In the background, the NSEC is erupting an ash plume. (g) Clast welded with glasses. f-g: photos by FC.

Figure S2. Relative abundance of different lithologies of clasts in different samples (Supplementary Table S1). (a) Poorly vesicular bomb, characterized by sub-rounded shape, grey-to-brownish color and scarce vesicularity. (b) Scoriaceous, vesicular bomb, characterized by more irregular aspect, similar color palette and more pronounced superficial micro- to macro-vesicularity. than type a) (c) Glassy bombs, characterized by dark, shiny aspect (glassy to the touch), highly irregular shapes and consistent macro-vesicularity.

Figure S3. Shape parameters for the samples PH4, PH6 and PH9 relative to the grain-size class $\phi = -1$ (a) and $\phi = 1$ (b). ALT: Altered clasts. GLY: Glassy clasts. FLU: Fluidal clasts. BLK: Blocky clasts. VES: Vesicular clasts.

Figure S4. Density distribution on the different lithologies recognized in the coarse material.

Figure S5. Top. Pre- and post-eruption satellite images of the area invaded by the lava flow. White squares: starting and end points of the topographic transects; white star: location of the main explosion vent. Bottom. Transects of the pre-eruption topography across the area overran by the lava flow, showing the elevation changes from the points A to A' (blue) and B to B' (red). Transects were computed on a Digital Surface Model at 1-meter spatial resolution, built from a Pleiades triplet acquired at Mt Etna on 24 December 2015.

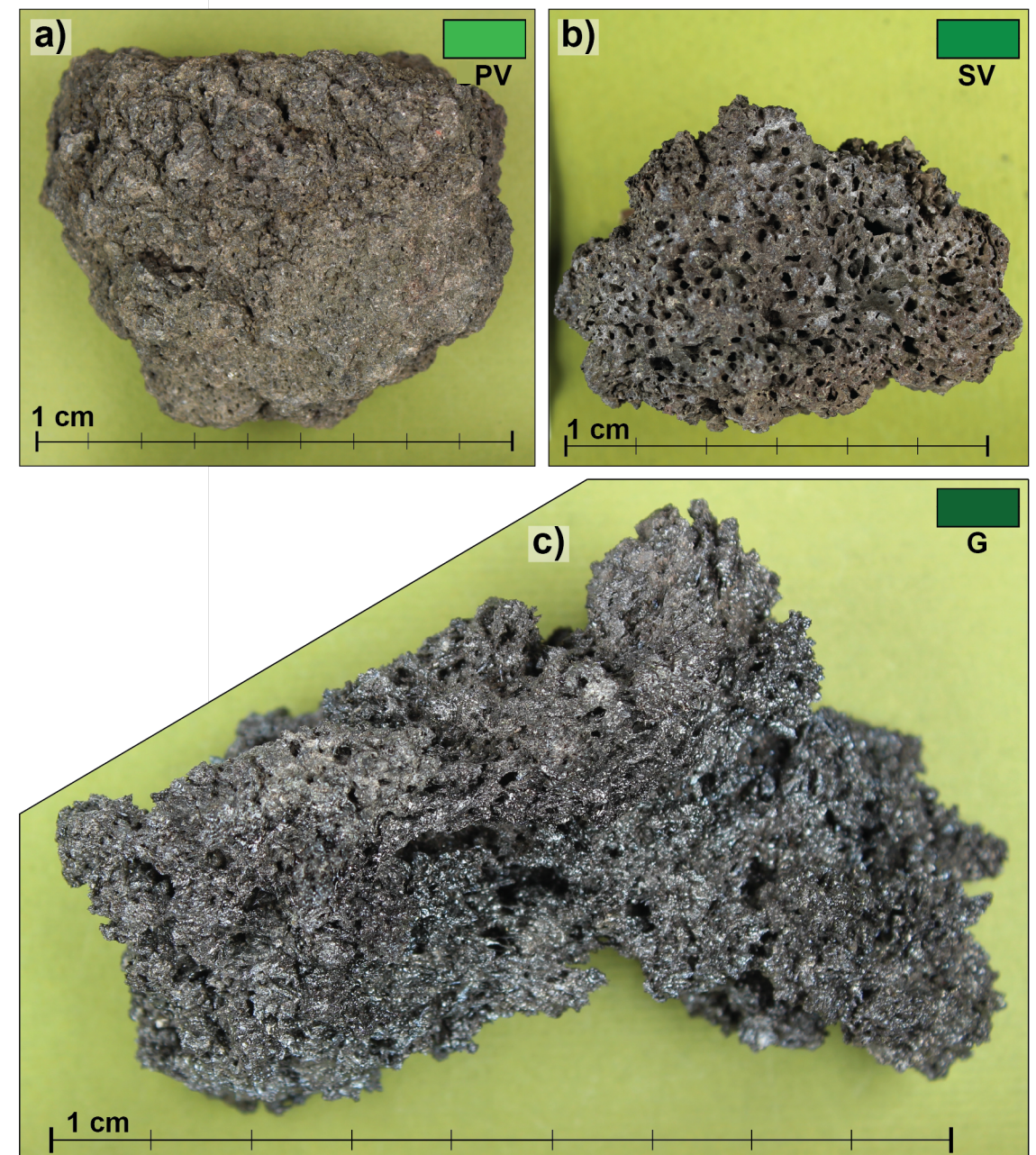
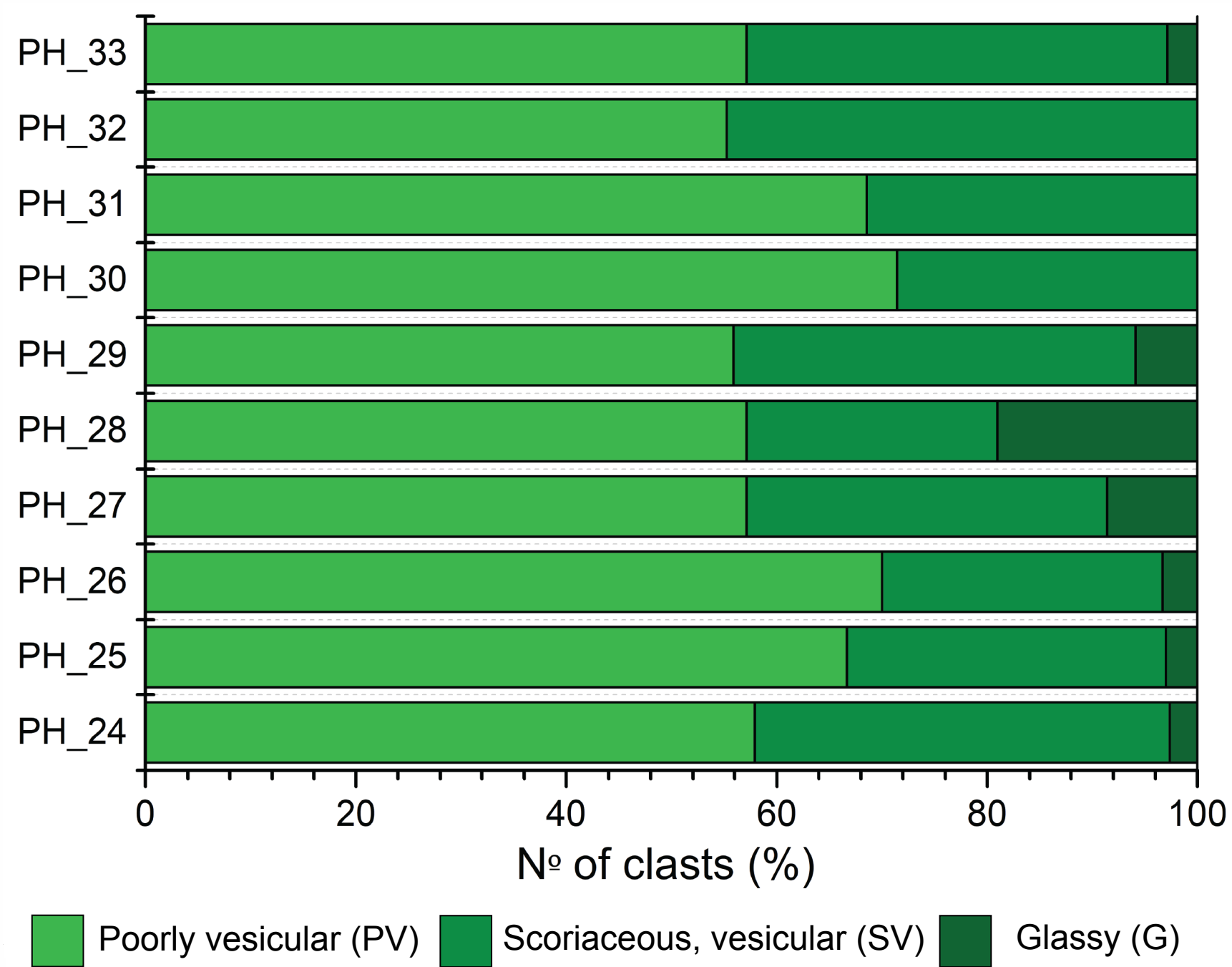
IV. Table

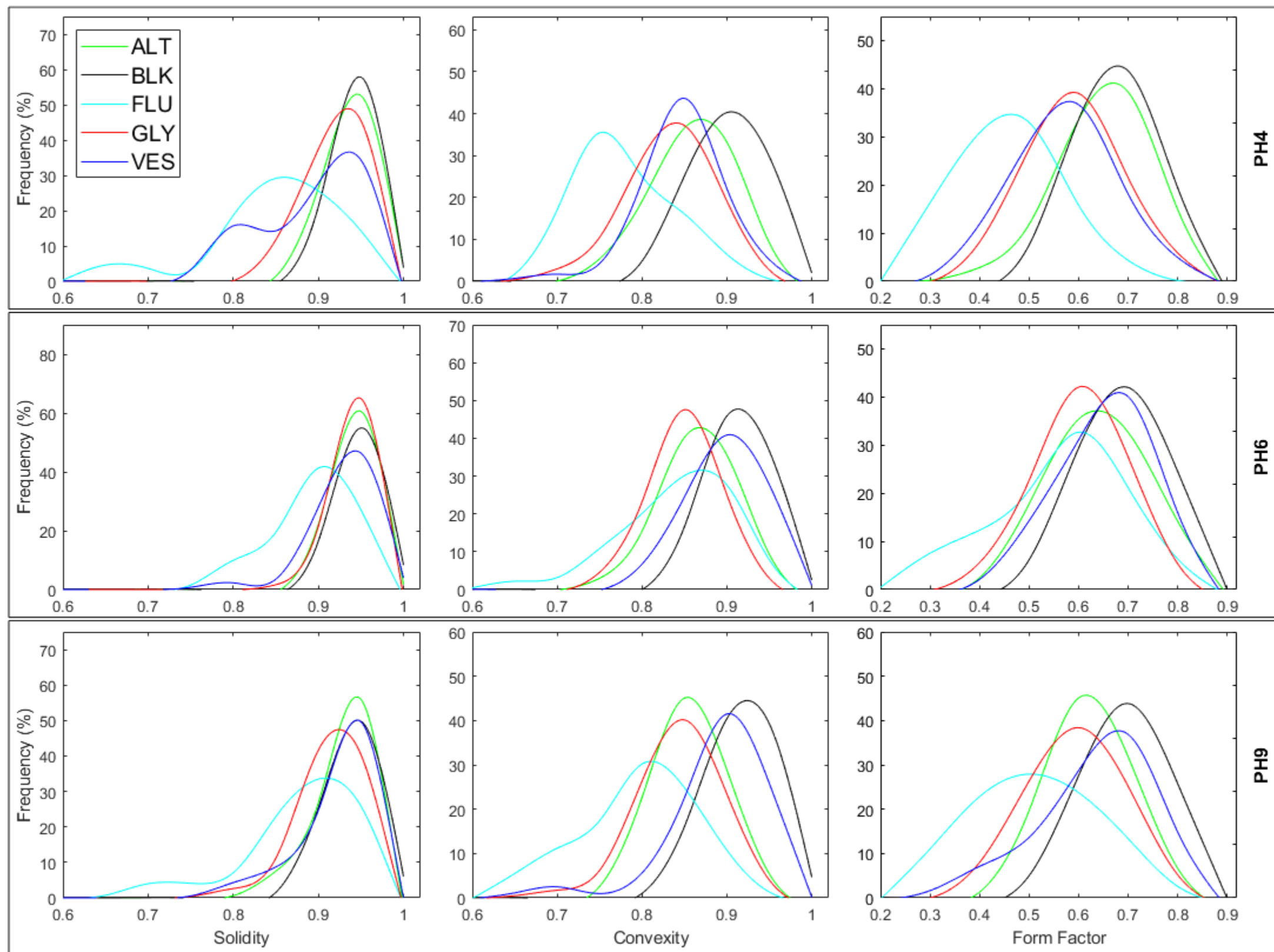
Table S1. List of samples with date of sampling, typology, coordinates, mass load per square meter (where available), and performed analyses.

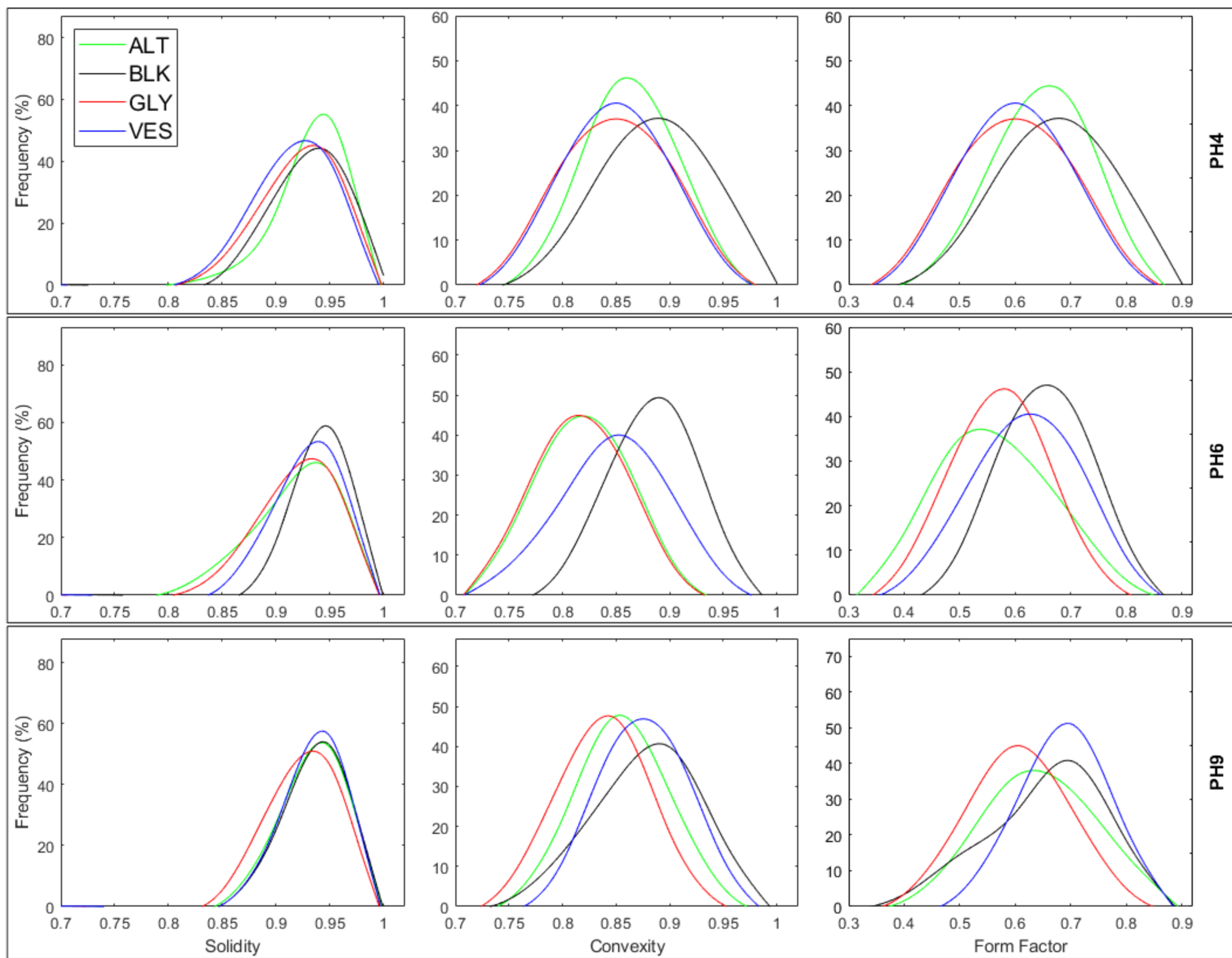
V. Data

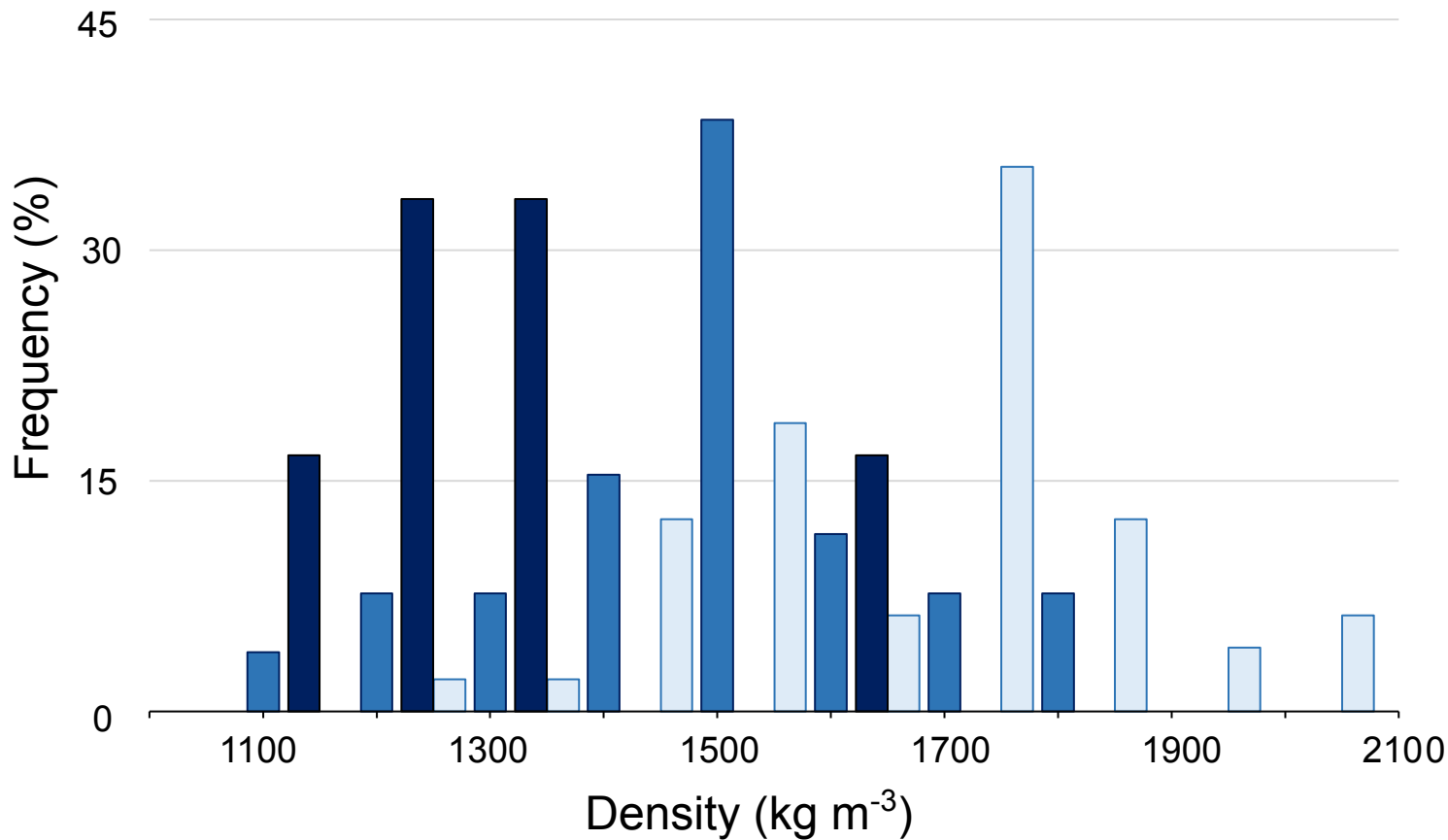
Data S1. Field and laboratory data.











□ Poorly Vesicular (PV) ■ Scoriaceous Vesicular (SV) ■ Glassy (G)

