Geological Magazine

Appendix to:

The Southern Mountains Zone, Isle of Rum, Scotland: volcanic and sedimentary processes upon an uplifted and subsided magma chamber roof

by

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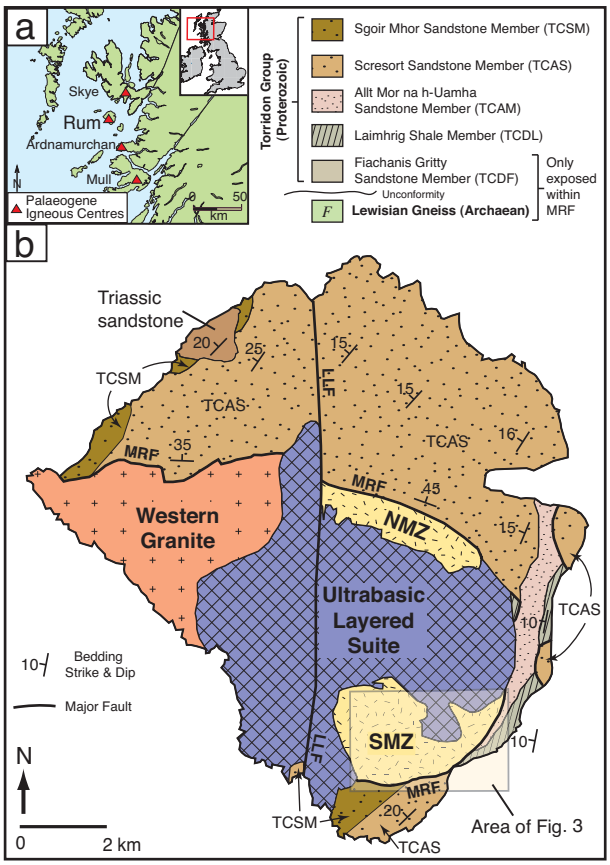

Figure 1: a) Location map and b) outline geological map for the Isle of Rum (after Emeleus 1997). NMZ = Northern Marginal Zone; SMZ = Southern Mountains Zone; MRF = Main Ring Fault zone; LLF = Long Loch Fault.

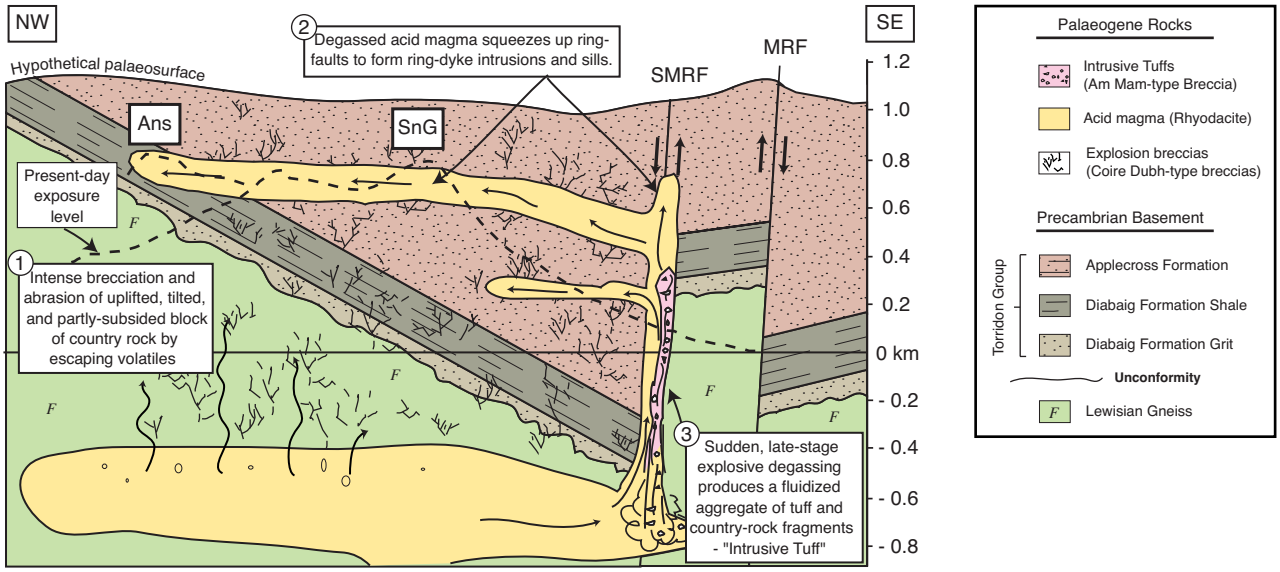

Figure 2: Schematic representation of Hughes's (1960) model for the subterranean formation and emplacement of the Southern Mountains Zone breccias and rhyodacites. SMRF = Southern Mountains Ring Fracture of Hughes (1960); MRF = Main Ring Fault of Bailey (1945); SnG = Sgùrr nan Gillean Peak; Ans = Ainshval Peak.

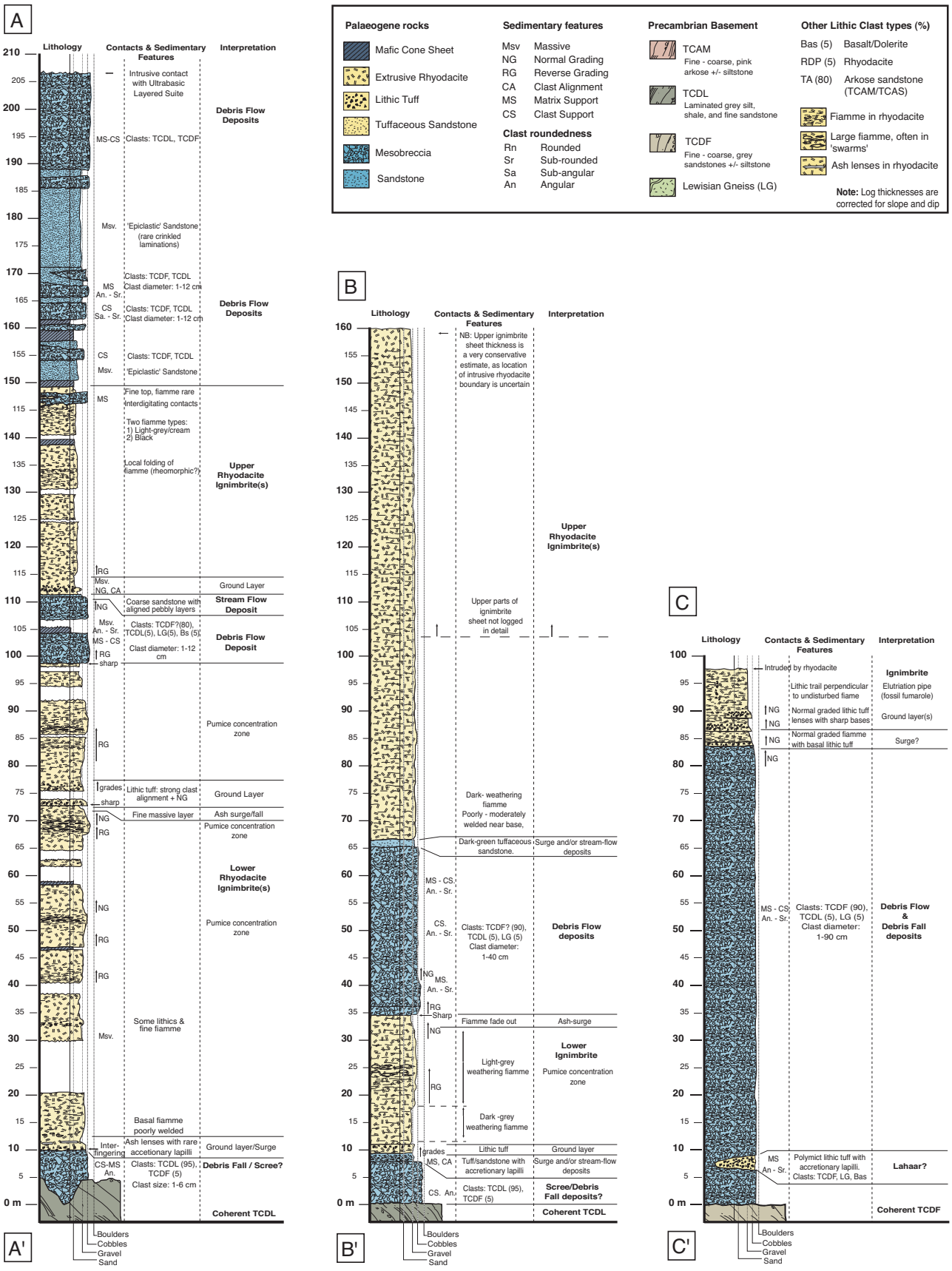

Figure 4: Measured logs of the volcano-sedimentary successions preserved: A) on Beinn nan Stac; B) in Sandy Corrie; and C) in Forgotten Corrie. See Figure 3 for lines of logs.

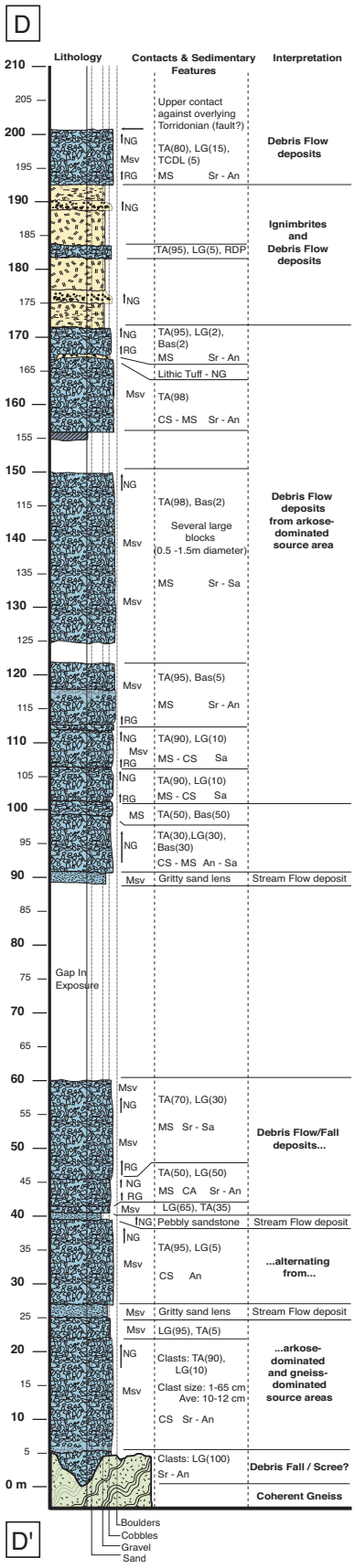

Figure 5: Measured log of the Base of Sgùrr nan Gillean volcano-sedimentary succession. See Figure 3 for lines of logs. See Figure 4 for key.

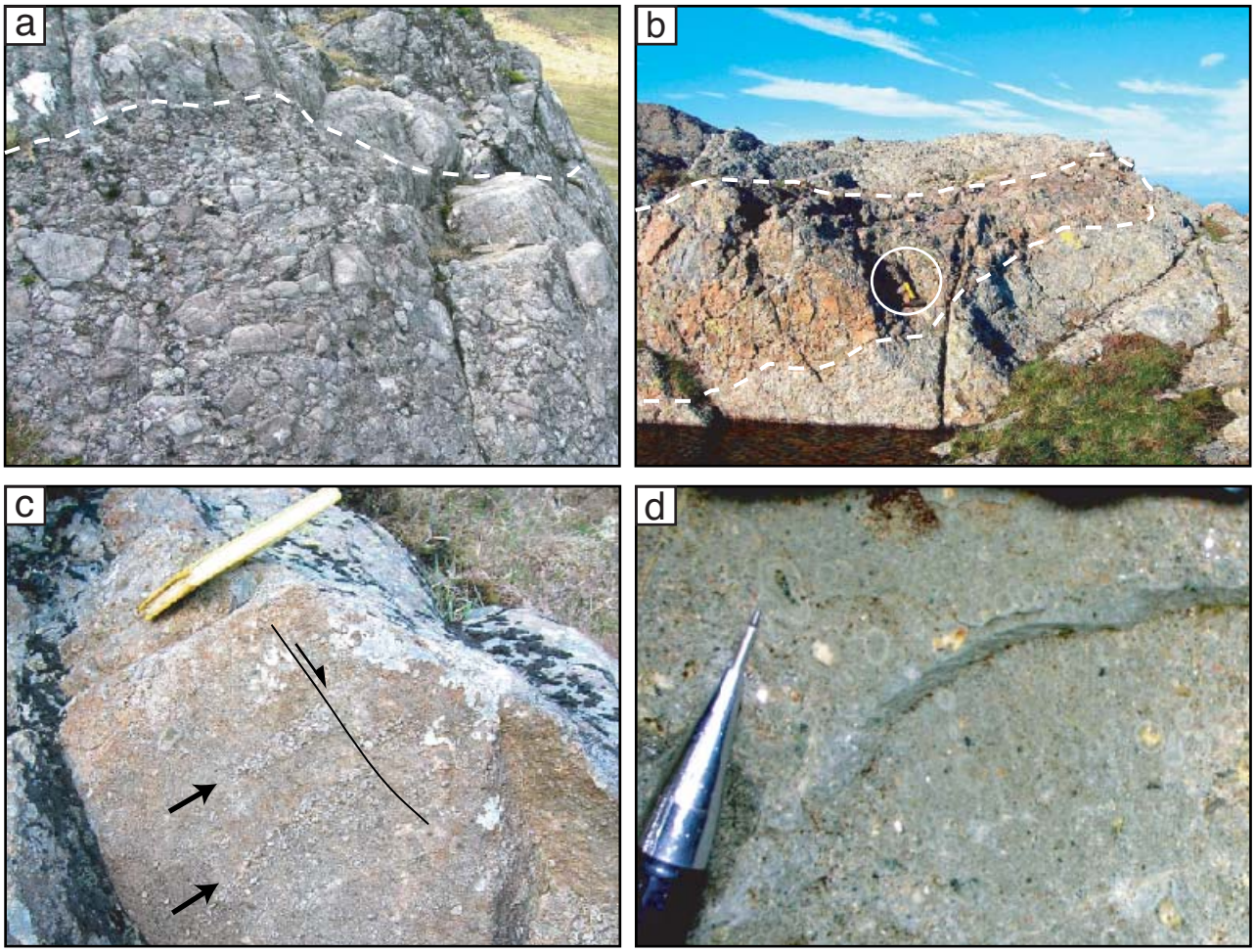

Figure 6: Sedimentary features in Coire Dubh-type breccias.
(a) Normally graded top of middle mesobreccia unit on Beinn nan Stac [NM 3977 9400]. Breccia passes up into coarse sandstone that is in turn overlain by lithic-rich rhyodacite. Note the variously sub-rounded to sub-angular clast shapes. Maximum clast diameter is ~ 20 cm. Clasts are predominantly coarse to fine, often laminated, grey sandstone (Fiachanis Gritty Sandstone Member?);
(b) Contacts between a metre-thick, lens-shaped, arkose-rich mesobreccia bed (dashed white outline) and gneiss-rich beds (above & below) in the Base of Sgùrr nan Gillean succession [NM 3810 9246]. Note 35 cm long hammer (circled) for scale. Beds dip to NW;
(c) Gritty/pebbly lenses (offset by small fault) in coarse, poorly-sorted sandstone in the Base of Sgùrr nan Gillean succession [NM 3781 9255]. The notebook is 15 cm in length. The sandstone dips NW and lies just below a concordant rhyodacite sheet and above arkose-dominated mesobreccias;
(d) Accretionary lapilli in coarse tuffaceous sandstone just below the Peak of Sgùrr nan Gillean rhyodacite sheet [NM 3819 9276]. The pen-top points to a ~ 8 mm diameter lapillus with multiple concentric zones.

Figure 7: Ignimbritic features in rhyodacite sheets.
a) Streaky (moderately-welded) fiamme in the upper Beinn nan Stac rhyodacite sheet [NM 3966 9403]; Note white-weathering (W) and black-weathering (B) fiamme types. Note 35 cm long hammer for scale;
b) Planar and wavy bed-forms in ash and crystal tuffs (surge deposits?) below the Peak of Sgùrr nan Gillean ignimbrite sheet [NM 3783 9330]. Hammer shaft is 25 cm long;
c) Discordant 'lithic lapilli' band in bedded rhyodacite, Forgotten Corrie [NM 3840 9429]. Little or no deflection of fiamme at the band implies it is pre- or syn-compaction. It is thus interpreted as a 'fossil fumarole', characteristic of high-temperature ignimbrites.

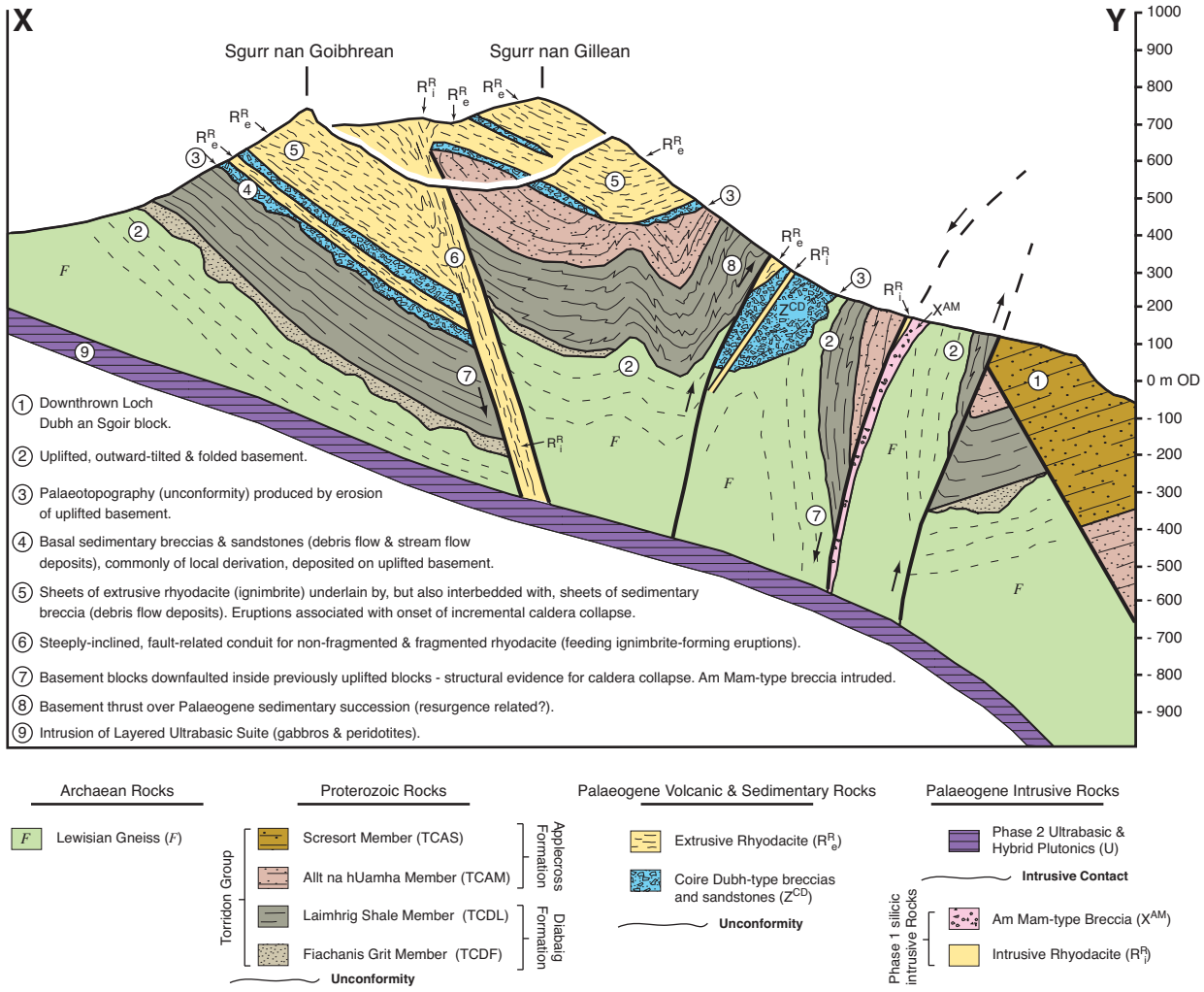

Figure 9: Interpretative cross-section through the Southern Mountains Zone. There is no vertical exaggeration. See Figure 3 for line of section (X-Y). Relationships around Sgùrr nan Gillean Peak are projected from the SW onto the plane of section. Numbers 1 to 9 list in approximate chronological order the main geological features/events, as reconstructed from this study.