*Response to Comment**

Response to Comment by J. Cassar on 'Model of limestone weathering and damage in masonry', by P.A. Gatt, *Xjenza*, vol. 11, 2006.

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Cassar is thanked for comments focusing only on non-carbonates, referred to in a small section of my paper. Cassar also comments that the "amount of damage and the mode of weathering will always depend on the surrounding environment". Actually, 'mode of weathering' refers to the style of loss of volume in stone, resulting in a distinct weathered surface independently of salt load which controls rate (amount) of volume loss.

Previous local studies cited by Cassar (e.g. Cassar & Vella, 2003) only confirm already known stratigraphical variations of marginal non-carbonates (<~6% clay/quartz/feldspars) in Globigerina limestone, although their relevance is undermined by the small geographical area sampled and the remarkable omission of geological (textural, depositional and tectonic) controls (Gatt, 2007).

Conclusions in the previous studies cited by Cassar are problematic because (i) universal limestone nomenclature (i.e. grain size/texture based) is substituted by undefined vernacular terms e.g. 'soll', also misconstrued as synonymous with the ambiguous attribute of "badly weathering stone" (in my paper, 'soll' is scientifically classified as an 'intensely bioturbated packstone facies'). Furthermore, (ii) limestone is unusually classified exclusively by its geochemistry, namely the slightly higher non-carbonate content in 'soll' relative to 'franka'; (iii) the non-carbonate fraction in Globigerina limestone is somehow implicated for rapid weathering in 'soll', and Cassar concludes that "the causes and mechanism of deterioration have also been established".

Actually, geochemical studies cited by Cassar are unsupported by laboratory weathering tests and fail to prove a causal relationship between non-carbonates and weathering. Instead, Cassar's comments speculatively forward the following incongruent mechanisms, some uncorroborated by observations of local masonry:

(1) Cassar & Vannucci (2001) claim 'soll' weathers rapidly because it "contains minerals such as smectite and illite-smectite which are highly expandable". Such clay-bearing rock weathers by the swelling of clay that would uniformly disrupt *only* the exterior 1mm (Gonzalez & Scherer, 2004). This contrasts with the mode of weathering observed in 'soll', dominated by strong differential weathering extending to >10mm from the surface. Therefore, swelling effect of clay is negligible. Later, (2) Cassar refers to a different weathering mechanism by invoking salt crystallisation: "the non-carbonate fraction, which occludes some of the pore space, resulting in…higher proportion of small pores". In fact, porosity in Globigerina limestone masonry is not controlled by marginal non-carbonates but by compaction and the level of calcite cementation/grain size in burrows and matrix, as described in my paper e.g. Sicilian limestone similar to 'soll' disintegrates rapidly during laboratory weathering tests because the less (calcite) cemented margins of bioturbation become a conduit for greater evaporation and salt crystallisation (Punturo *et al.*, 2006). Lastly, (3) Cassar & Vella (2003) reject all previous weathering mechanisms by stating that "clay mineral content cannot, however, be utilized to distinguish between franka and soll".

Therefore, previous local geochemical studies given credence by Cassar are mostly immaterial to studies (including my paper) on weathering of local limestone.

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