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Sandstone and conglomerate geomorphology in the Serra do Segredo area of southernmost Brazil: contribution for a global distribution of features and processes

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According to the recent and inspiring global review performed by Migoñ (2020), one of the major gaps in conglomerate geomorphology research is the global geographical coverage of such terrains and corresponding landforms. Aiming at contributing with this global distribution, this communication presents the *Serra do Segredo* area, located in subtropical, southernmost Brazil (30°32'S; 53°33'W), in the territory of the Caçapava UNESCO Aspiring Geopark. That relatively small (some 30 km²) cuesta escarpment was developed upon a 300-meter-thick coarsening-up succession comprising the uppermost section of the Ediacaran-Cambrian, alluvial/fluviol Santa Bárbara Group of the Camaquã Basin. That rock package, within the cuesta domain, begins with tabular sandstones, grading towards a thick pile of lens- and scoop-shaped, cross-bedded, poorly sorted, polymictic conglomeratic sandstones and true conglomerates, and ending with more frequent interlayering of disorganized conglomerates/breccias with very angular clasts of granite and greenschist. The *Serra do Segredo* area exhibits: (a) tilting of strata to ESE, as well as an ESE-WNW pattern of lineaments limiting blocks; (b) a very smooth folding of the entire succession, with open fold crests oriented E-SE; and (c) a slight difference of tilting, with 20° in the northern part, and 30° in the southern portion. This last characteristic results in the appearance, in map view, of a more solid, consistent, uniform massif in the south, and more spaced "sub-ranges" in the north, giving rise to a more substantial accumulation of colluvial material, and to the installation of a fluvial valley (of the *Lanceiros* creek). The *Serra do Segredo* is a stepped cuesta, with three clearly distinguishable steps. The first and western step was built dominantly upon sandstones. That westernmost, external cuesta rim is relatively continuous, straight to smoothly curved, denticulated (according to ESE-WNW fractures), and only disrupted in zones with higher fracture density or volcanic dykes, hence zones of preferential weathering, soil development, and denser vegetation cover. The second step, though also dominated by sandstones, has an overall coarser grain size, with substantial interlayering with conglomerates. That inner step rim, despite being also continuous, is much more curved, with more abundant embayments, and also denticulated. The third and final step, fully developed upon conglomerates and breccias, can barely be recognizable as a step. That uppermost massif (which extends through some 8 km²) can be regarded as a true conglomerate dome cluster: steep-sided domes with strikingly rounded summits (covered by aprons of detached pebbles/cobbles), separated by ESE-WNW lineaments. That portion shows more significant

emergence in the south, and a series of isolated domes (regionally known as '*pedras*') in the northern portion. In the conglomerate domes, smaller scale features include: wavy walls, bedding caves, arcades, *tafoni*, stepped cliffs, honeycombs (in permanently shadowed, inner walls of caves) and speleothems. Also noteworthy is the large amount of metric to decametric collapsed blocks at the base of the conglomerate domes, even forming talus voids and caves, attesting for the frequent and recent (in geological timescales) occurrence of important rock slope failures.