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Contrasting flow units of Pudahuel Ignimbrite on Maipo and Cachapoal valleys (Central valley, Chile)

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Pudahuel Ignimbrite is a thick and widespread sequence of pyroclastic density current deposits that infill Maipo and Cachapoal valleys in the Chilean Central Valley, with a probable eruption age of ca. 150 ka. Despite the exposure beneath one of the largest megacities in South America, its internal stratigraphy and mechanisms of emplacement are poorly known. And contrary to some other low aspect ratio ignimbrites, outcrops on each radial valley are remarkably different. On Maipo valley, exposures correspond to a stacked succession of at least two massive pyroclastic flow deposits, locally with a minor stratified surge horizon. The lower unit presents polimictic clasts (volcanics and plutonics), light and dense white pumices, abundant degassing pipes and lithic lens, and low pumices/lithics ratio; whereas the upper unit exhibits finer grain size, a higher pumices/lithics ratio and almost lacks degassing pipes and lithic lens. On the other hand, exposures of Cachapoal Valley correspond to a thick massive finer-grained and zoned pyroclastic flow deposit with a minor basal pyroclastic surge deposit, both lacking degassing pipes and lithic lens. They contain mostly altered volcanic clasts, and white, gray and banded flat pumice varieties. These contrasting features (different structures, lithofacies, accidental lithic assemblage and pumice densities) point to the existence of different flow units between both valleys, which taken together describe a more complex caldera collapse episode with significant influence on hazards assessment related to these extreme events.