



**Figure 10: Schematic summary of the two weathering systems. According to our findings, the regolith of La Campana (LC) is dominated by a positive feedback loop between weathering-induced fracturing (WIF) and the infiltration of fluids to depth. WIF creates deep-reaching pathways for fluids (water, O<sub>2</sub>) and hence a good connectivity between the surface and the subsurface. Moreover, the low water availability in the Mediterranean climate inhibits the formation of large amounts of secondary minerals (i.e., low weathering intensity) that could seal these pathways. The high denudation rate in LC results in a short residence time of weathered material in the profile and could therefore contribute to the detected lower weathering intensity (i.e., less chemical weathering). The regolith of Nahuelbuta (NA), on the other hand, was found to be dominated by a negative feedback loop between the formation of secondary minerals and amorphous phases, and the infiltration of fluids to depth. These secondary solids are consequences of the high water availability in NA that results in intense chemical weathering (i.e., high weathering intensity). The high weathering intensity entails the formation of abundant secondary minerals and amorphous phases that reduce the connectivity between the surface and the subsurface. The lower denudation rate and thus longer residence time of weathered material in NA likely contributes to the more intense chemical weathering. dep. = depletion.**