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Pyroclastic density currents from the 2015 Calbuco eruption, Chile; a case study for linked hazards (PDC-lahars).

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On 22-23 April 2015 Calbuco Volcano in southern Chile erupted, generating sub-Plinian eruption columns, multiple topographically confined pyroclastic density currents (PDC's), and both hot and cold primary eruption-triggered lahars in 11 drainages that caused significant damage to infrastructure. The eruption emplaced c. 0.31 km³ of NE-dispersed tephra fall and pdc deposits, dominated by relatively coarse-grained and dense scoria and lapilli (1800-2100 kg/m³). We present, distribution maps, and grain size and componentry characteristics of these deposits to interpret the chronology of the eruption and emplacement mechanisms of the pyroclastic density currents. We demonstrate how different catchments received differing proportions and volumes of tephra and pdc material. The potential for linked or cascading hazards is an important aspect of hazard assessment at any volcano. In this work we consider the tephra and PDC deposit distributions and their respective roles in generating both the eruption triggered and rain-triggered lahars in the drainages around Calbuco and surrounding landscape. We demonstrate how deposit thickness, grain size characteristics and seasonal effects can affect the propensity for cascading hazards. We put forward some suggested methodology for how such linked hazards can be taken into account when undertaking hazard mapping.