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The South Pyrenean fold and thrust belt (NE Spain) is an excellent example to study the evolution of fluids during the progressive exhumation of a foreland basin.

This study is focused on the Cadí thrust sheet, emplaced from the middle Eocene to the lower Oligocene. The southern limit of the Cadí thrust sheet is the Vallfogona thrust, which places middle Eocene turbidites over upper Oligocene alluvial sediments. The main thrust fault, together with other minor fractures (inverse and strike-slip faults, bed-parallel and bed-perpendicular veins) acted as paths for fluids. Diverse generations of calcite cement precipitated in these fractures, recording two fluid flow stages during the emplacement of the Cadí thrust sheet.

During the first stage, calcite cement precipitated in small veins and vug porosity within the hanging wall of the main thrust fault from a fluid with a $\delta^{18}O$ of +12.12‰ SMOW at temperatures around 150 ºC. During the second stage, calcite cement precipitated in the main thrust fault and in minor thrusts and strike-slip faults affecting the hangingwall and footwall. This second calcite cement precipitated from a fluid with a $\delta^{18}O$ between +4.22 and +6.37‰ SMOW at temperatures around 100 ºC.

Keywords: Fluids, thrust faults, South Pyrenean fold and thrust belt