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## The influence of backstop geometry in the structural style of the Eastern Cordillera of Colombia: A sandbox modeling approach

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Among the foreland belts of the Andean mountain system, the Eastern Cordillera of Colombia (EC) represents a unique example of an isolated, bi-vergent mountain belt. In contrast, to block tectonics of broken foreland basins, it displays a ductile deformation style which involves two mountain fronts with a structural relief of the order of 10 km. Internal parts of the EC have been shortened by buckling at high and a homogeneously strained basement at deeper structural levels. These deformation patterns likely attest to conditions of a thermally weakened backarc setting. Two opposed scenarios have been postulated for its surface uplift and consequent exhumation: 1) an E-migrating deformation front and the formation of progressively forward breaking faults; and 2) the pop-up of a weak crustal welt enclosed by strong foreland blocks. In this latter setting, a synchronous early formation of marginal mountain fronts and a late-stage surface uplift of a central domain may be anticipated. These two constellations compare, in terms of a contrasting model setup, to a foreland migrating orogenic wedge or a relatively stable, doubly vergent wedge formed above a structural discontinuity or rheologic boundaries that acted as sites for the nucleation of the marginal faults.

In this contribution, we opt to examine the “boundary” conditions for the development of a doubly vergent wedge formed at the tip line of a rigid tapering backstop, that simulates a rigid foreland block. With respect to the shape of this backstop, we examine the effects of tip angles less than the angle of internal friction ( $<30^\circ$ ) and find, that at a low tip angle of  $10^\circ$  the pop-up evolves above a forward-breaking principal kink-band with the synchronous formation of a sequence of conjugate back-kinks that cut into the sand pack, as it is pushed toward the backstop. At a moderate tip angle of  $20^\circ$  the forward-breaking kink-band is slightly steeper than the backstop and gives rise to a frontal fold with an overturned limb. This latter geometrical configuration loosely compares to the structural relations of a structural section through the high plains of Bogotá, where the eastern mountain front defines a strongly deformed antiform, that is juxtaposed against an undeformed margin of the adjacent Guyana shield.