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Supplement of

Analogue experiments of salt flow and pillow growth due to basement faulting and differential loading

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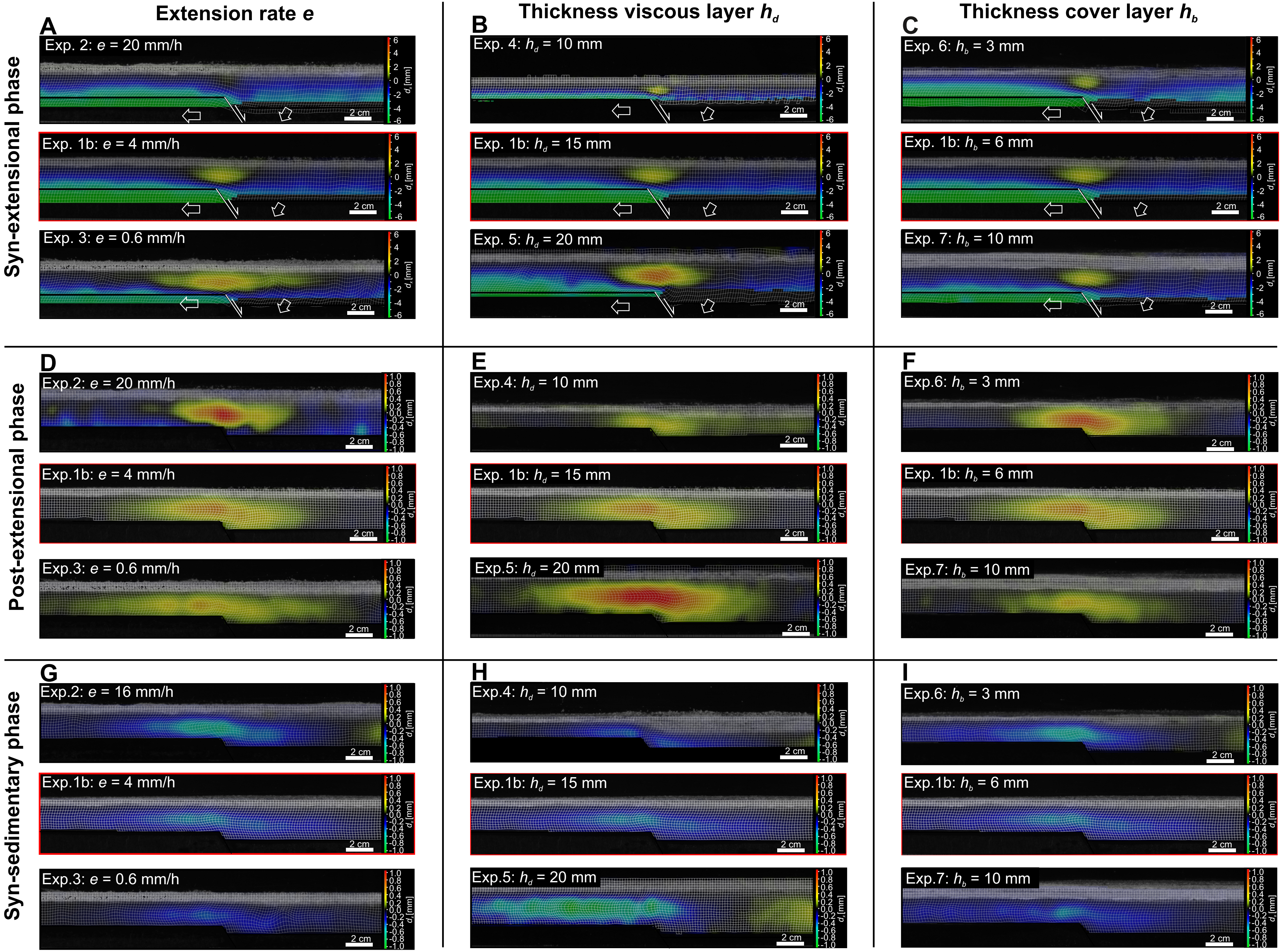

Figure C1. Parameter study of horizontal displacement d_x above the tip of the basement fault during the syn-extensional, the post-extensional and the syn-sedimentary phase (in side view). Coloured areas display rightward (yellow-red) and leftward (green-blue) movement of the analogue material. Displacement patterns are compared for varying extension rates of the basement *e* (**A, D, G**), thicknesses of the viscous layer h_d (**B, E, H**), and thicknesses of the cover layer h_b (**C, F, I**).

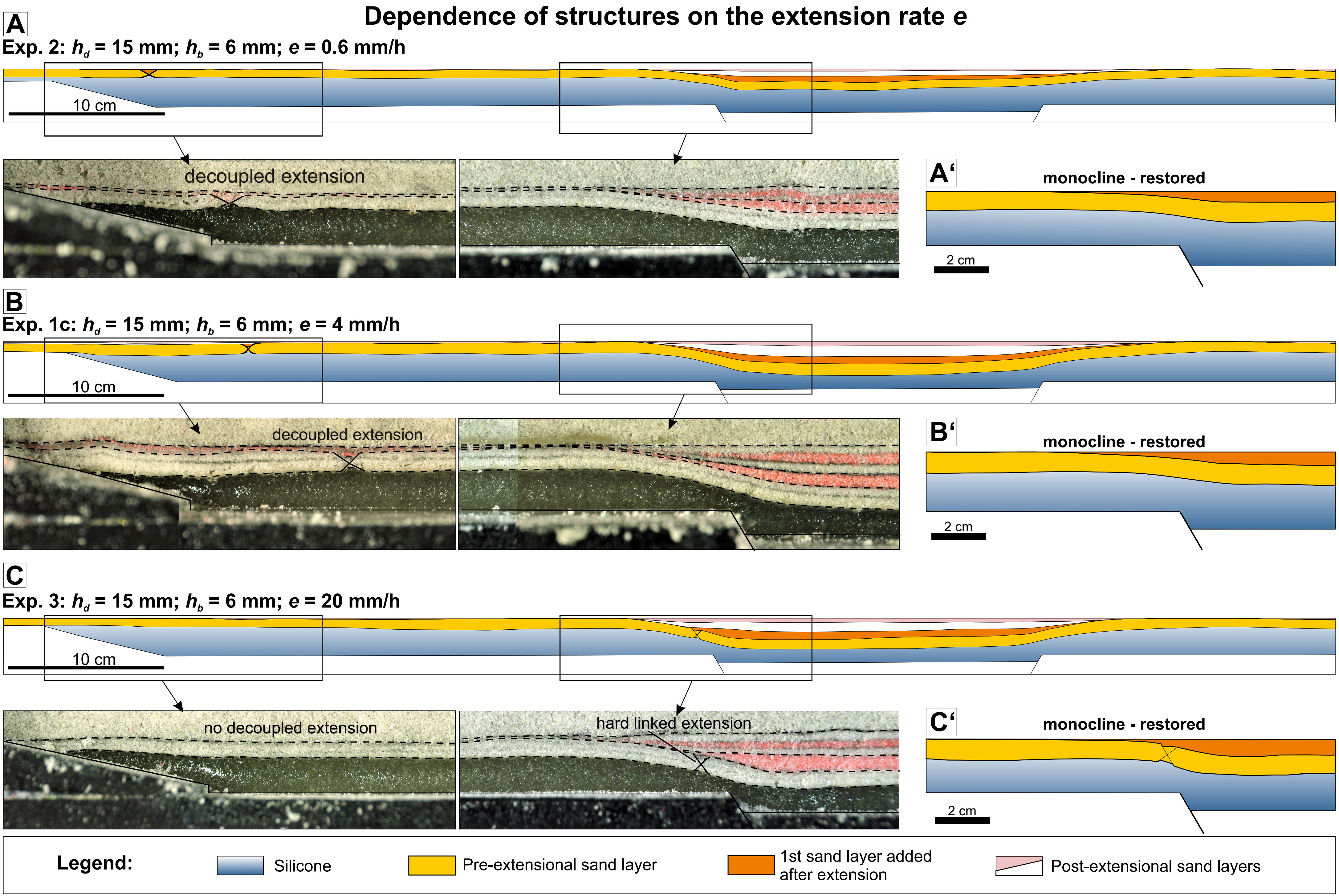

Figure C2. Comparison of experimental structures (after 4 days) depending on the basement extension rate *e*. In experiments with slow basement extension **(A/B)**, the cover graben is located in larger distance from the basement graben compared to experiments with fast basement extension **(C)**. With increasing basement extension rate, the monocline in the cover layer becomes narrower and the subsidence of the hanging wall peripheral sink increases **(A'/B'/C')**.

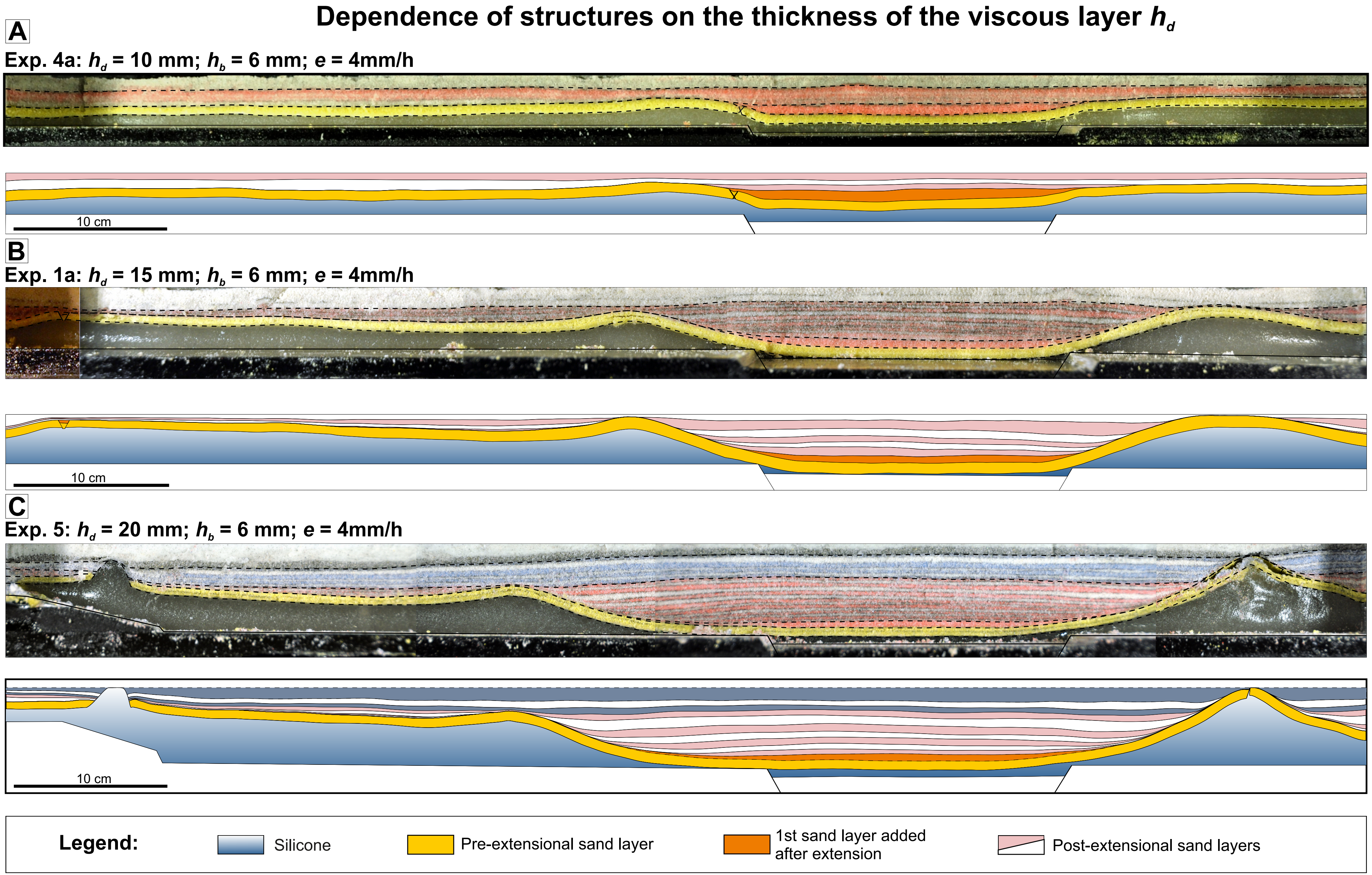

Figure C3. Comparison of final experimental structures depending on the thickness of the viscous layer h_d. The pillow structures are located in larger distance from the basement fault and their elevation is higher when increasing h_b. In the experiment with thickest h_b **(C)**, the viscous material pierced the overburden layer.

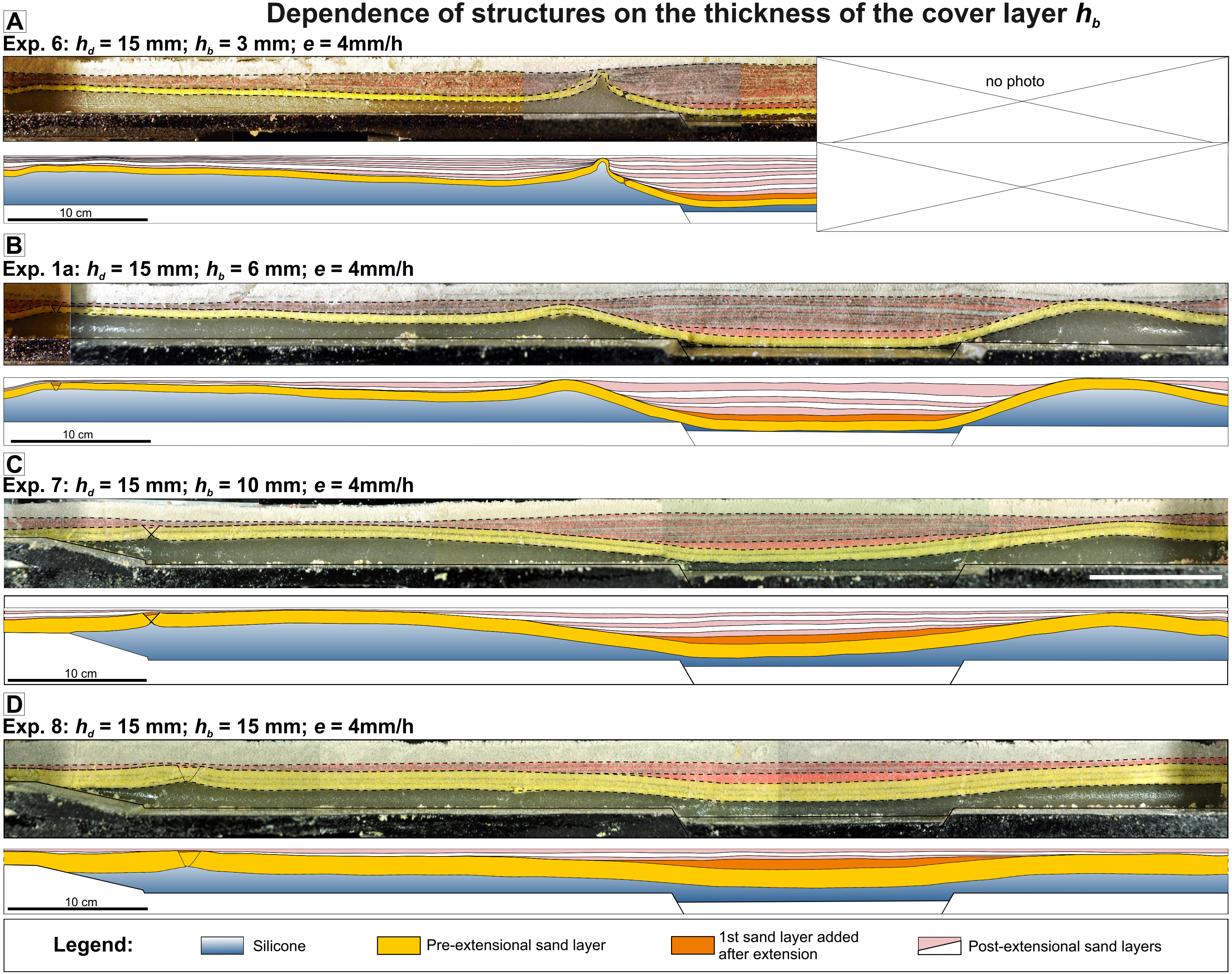

Figure C4. Parameter study of final experimental structures depending on the thickness of the pre-kinematic cover layer h_b. The width of the pillow structures is wider and their elevation is smaller when increasing h_b. In the experiment with the thickest pre-kinematic cover layer (Exp. 8; **(C)**), no pronounced pillow structures evolved.

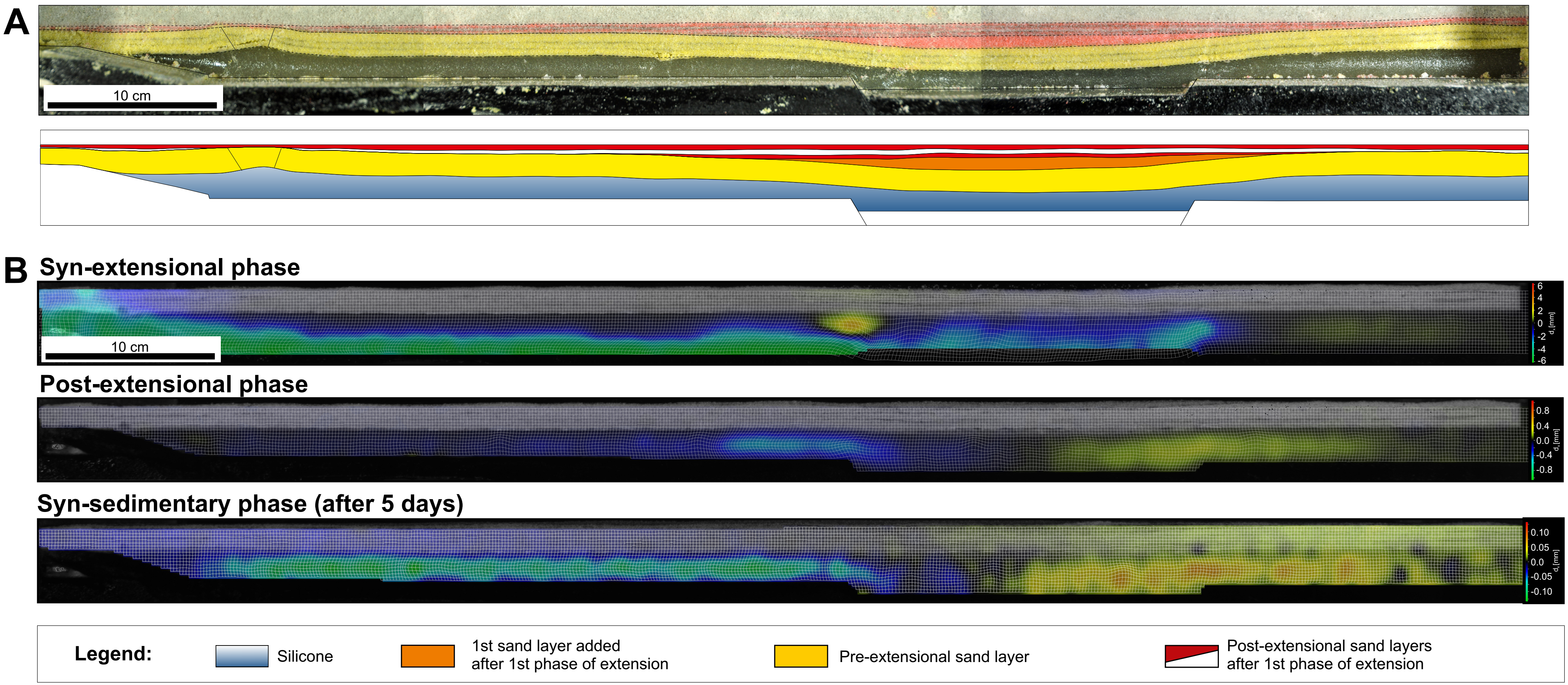

Figure C5. Cross-section and displacement patterns of Exp. 8 (h_b = 1.5 cm, h_d = 1.5 cm, e = 4 mm/hr). **(A)** In the cross-section no significant pillow structures can be observed above the footwall blocks. The decoupled cover graben at the left edge of the box is slightly uplifted. **(B)** The time series of displacement patterns shows that upward movement of the viscous material is initiated one hour after basement extension. After 5 days significant material movement occurs in the entire viscous layer.

Tab. C1: Data for plot in Figure 11

Dependence on basement extension rate e

Experimental stage	Displacement rate in the viscous layer above the basement fault tip [mm/h]		
	Exp. 2 (e = 20 mm/h)	Exp. 1b (e = 4.0 mm/h)	Exp. 3 (e = 0.6 mm/h)
syn-extensional	1.8	1.43	0.55
post-extensional	4.73	2.65	1.08
syn-sedimentary	10.77	0.50	0.40
syn-sedimentary	20.87	0.60	0.48
syn-sedimentary	30.99	0.56	0.56
syn-sedimentary	41.0	0.60	0.54

Dependence on thickness of the viscous layer hd

Experimental stage	Displacement rate in the viscous layer above the basement fault tip [mm/h]		
	Exp. 4 (hd = 1 cm)	Exp. 1 (hd = 1.5 cm)	Exp. 5 (hd = 2 cm)
syn-extensional	0.60	1.43	2.5
post-extensional	2.11	2.65	4.97
syn-sedimentary	10.31	0.50	0.74
syn-sedimentary	20.35	0.60	0.80
syn-sedimentary	30.52	0.56	0.70
syn-sedimentary	40.55	0.60	0.75

Dependence on thickness of the cover layer hb

Experimental stage	Displacement rate in the viscous layer above the basement fault tip [mm/h]		
	Exp. 6 (hb = 0.3 cm)	Exp. 1 (hd = 1.5 cm)	Exp. 7 (hb = 1 cm)
syn-extensional	1.00	1.43	1.43
post-extensional	4.00	2.65	2.08
syn-sedimentary	10.70	0.50	0.36
syn-sedimentary	20.75	0.60	0.46
syn-sedimentary	31.05	0.56	0.46
syn-sedimentary	40.80	0.60	0.5