Figures 15 a and b. Disturbed 5-10 cm thick zone in cross-bedded deltaic sand at Slättheden (site 2). Note (gravitational) enrichment of heavy minerals and coarser grains along the strongly deformed contact between inclined, evenly bedded sand below and current-bedded sand above. The deformations are interpreted as possible effects of earthquake-induced liquefaction and dewatering during the build-up of the sequence. Photo: R.L. 1990.

Figure 16. 0.3 m thick bed of deformed sandy and silty sediments at Svanamyran (site 3). The darker, boudin-like lumps consist of coarser sand while the more light-coloured material consists of fine-sand and silt. The deformed bed, as well as the deposits above and below, are very compact and, for this reason, the sequence is rather stable even though situated below the ground--water table. The bed is horizontal and a bed of exactly the same character was found in another pit some 100 m away. Photo: R.L. 1990.

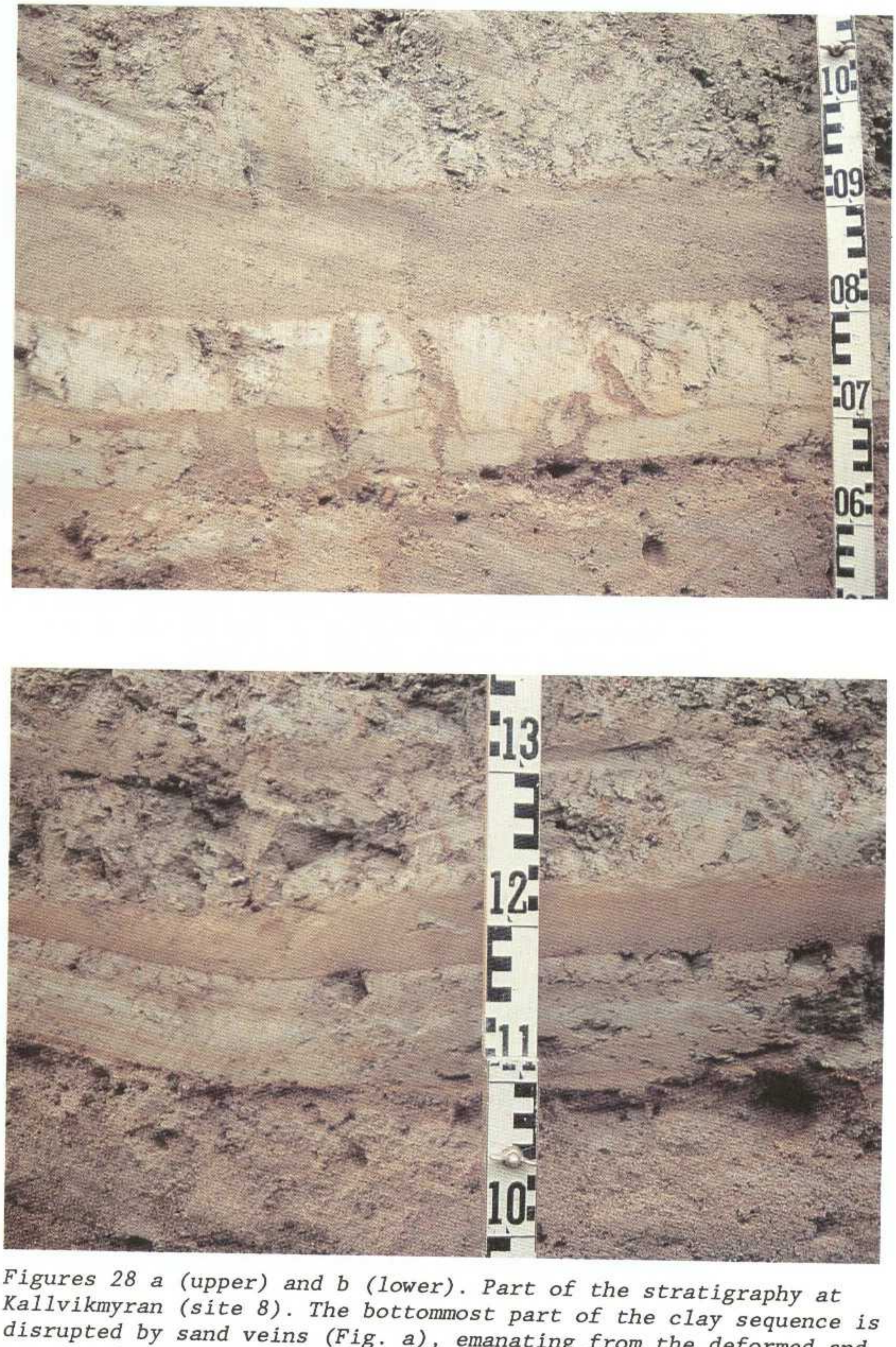
Figure 19. Sag structures in deltaic sand at Svanamyran (site 3). The deformed sequence was eroded by running water after deformation and overlain by current-stratified sand. Photo: R.L. 1990.

Figure 20. Ice-wedge cast and cryoturbations in fine-sandy and silty sediments, presumably of interstadial age, at Rotheden (site 4). Scattered boulders on ground surface and a thin cover of structureless silty-sandy diamicton, interpreted as a "deformation till", indicate that the sediments have been covered by inland--ice. The periglacial features probably date from an ice-free period with a harsh climate during the Weichselian glaciation. Photo: R.L. 1990.

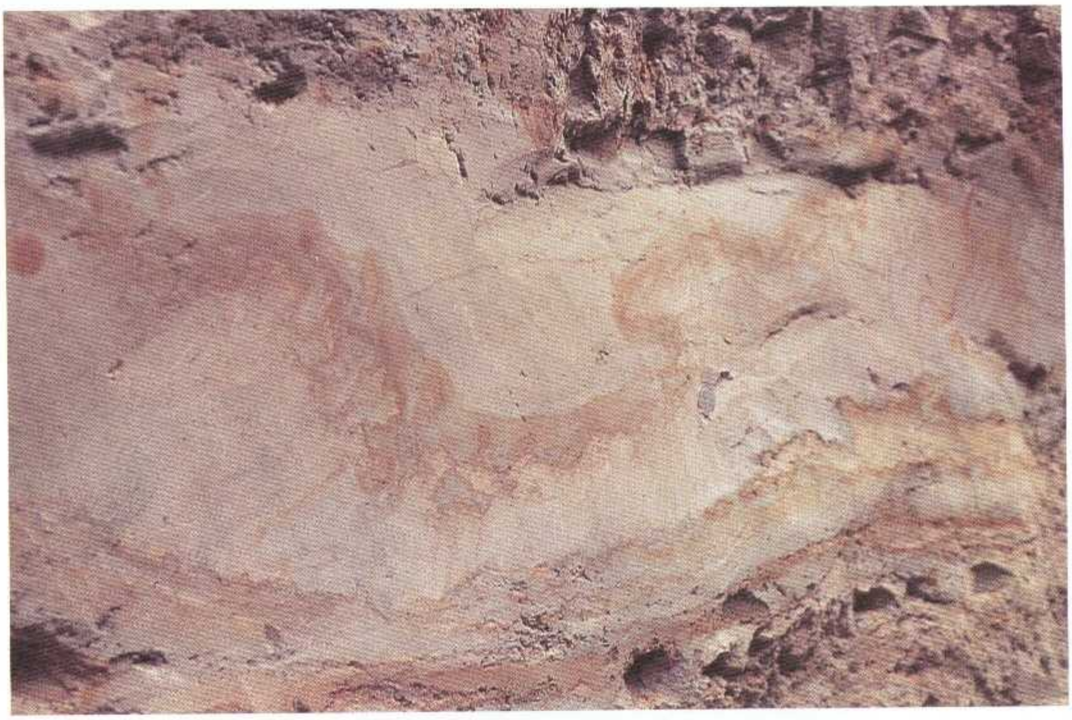
Figure 21. Strongly deformed and compacted silty and sandy sediments at Furuholmsbäcken (site 5). The lowermost part of the covering clay is involved in the deformation and covered by a thin layer of sand. Photo: R.L. 1990.

Figure 22. Deformed silty-sandy sediments at Sockberget (site 6). The vein, or pipe, of rusty sand injecting the sediment emanates from thick deposits of sandy gravel resting below a 1 m thick bed of "deformation till" visible at the bottom of the picture. 25 cm long trowel for scale. Photo: R.L. 1990.

Figure 23. Deformed sand and silt covered by undisturbed clay at Sockberget (site 6). The process of formation for the spectacular sand pocket to the left of the trowel is not understood but may be the result of sand injection from sandy gravel resting beneath the deformation till at the bottom of the section. Note also the thick lens of sand on the small boulder to the right of the trowel. The deformed sequence has been eroded before the deposition of clay. This erosion, which occurred at a water-depth of some 100 m, may have been caused by crustal movements resulting in discharge of water from the area in connection with the faulting some 10 km to the northwest. Photo: R.L. 1990.



Figures 28 a (upper) and b (lower). Part of the stratigraphy at Kallvikmyran (site 8). The bottommost part of the clay sequence is disrupted by sand veins (Fig. a), emanating from the deformed and compacted sand below, and is covered by a sand layer. The sediment deformation together with small lumps of clay and graded bedding in the sand layer (Fig. b) indicate a short-lived event with turbulent water, probably caused by earth tremor and crustal movements in connection with faulting in the area. Photo: R.L. 1990.



Figures 29 a and b. Flame-like deformational structures in fine--sandy and silty beds of glacial origin at Lillsundet (site 9). The features are interpreted as being seismically induced in connection with the early postglacial faulting in the area. The upper layers (not visible in the photograph) were unaffected by deformation. Note enrichment (gravitational) of heavy minerals towards the bottom of the most disturbed part of the section (Fig. a, upper). 2.5 cm coin for scale. Photo: R.L. 1984.

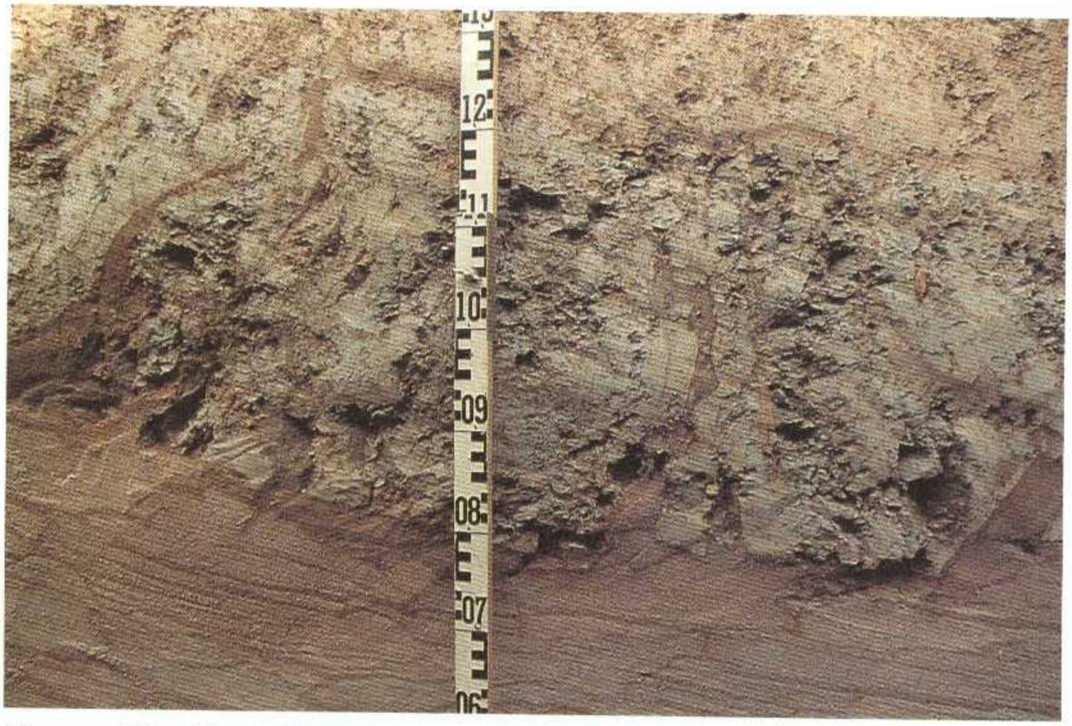


Figure 30. Glaciofluvial sand covered by clay at Storsundet (site 10). The lowermost part of the clay sequence is broken and injected by sand veins, terminating into a horizontal sand layer. The sand beneath the clay is compact but the primary layering shows only minor deformations. Photo: R.L. 1990.

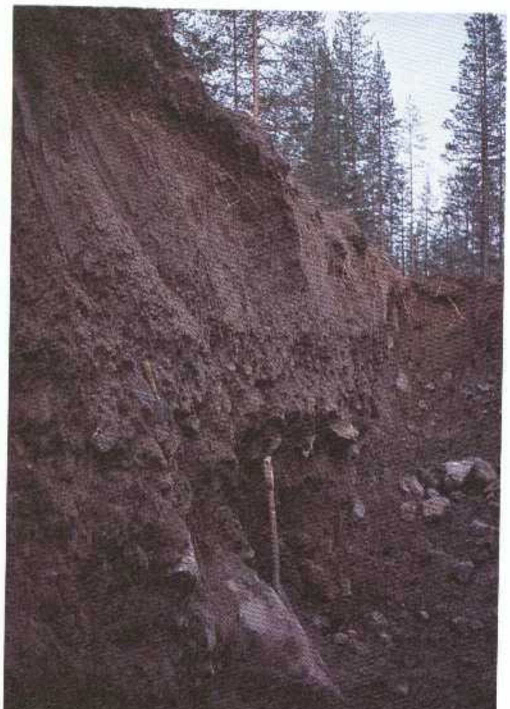


Figure 34. Typical section through graded till at Furuträsket (site 13). The maximum grain-size successively increases downwards and the biggest boulders are not found until a depth of about 3-4 m. Photo: R.L. 1983.

Figures 35 a and b. Abrupt transition between undeformed till and graded till at the rim of a graded-till depression at Furuträsket (site 13). Note boulders on ground surface above undeformed till and lack of boulders above the graded part of the section. The pictures show the same section but from the opposite direction. The undeformed stratigraphy, beneath a boulder-strewn surface, contains a 1 m thick brownish till resting on a thick grey till. The till beds are intercalated by a thin layer of silt. Photo: R.L. 1990.

Figure 36. The graded tills are extremely compact and the clasts so firmly fixed in the matrix that they are often crushed in connection with excavation. From 2 m depth in a trench at Furuträsket. Photo: R.L. 1990.

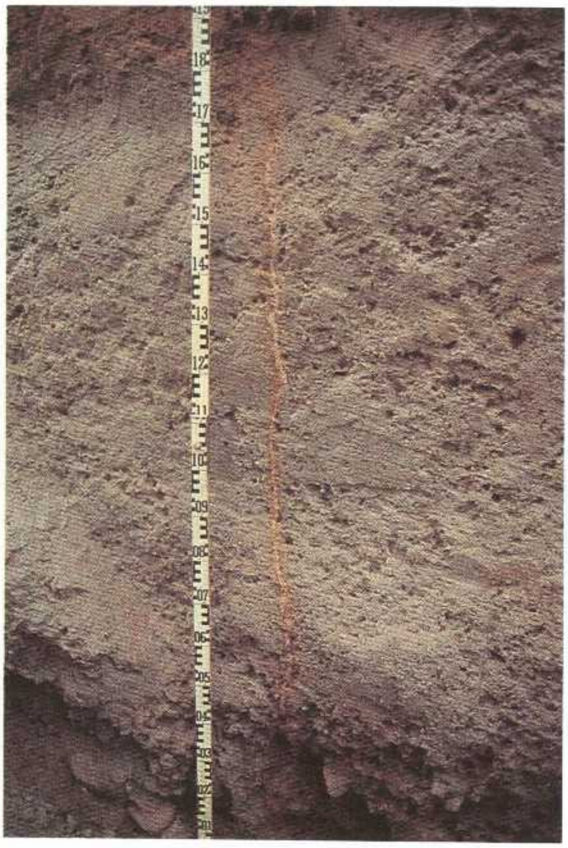


Figure 41. Sand-filled vertical crack through a graded till section at Furuträsket. The crack reaches to a depth of at least 3 m and can therefore hardly be the result of frost activities. Whatever the mechanism the formation belongs to, the straightness, the uniform width and appearance of the crack give evidence of the extreme compactness of the deposit. Photo: R.L. 1990.

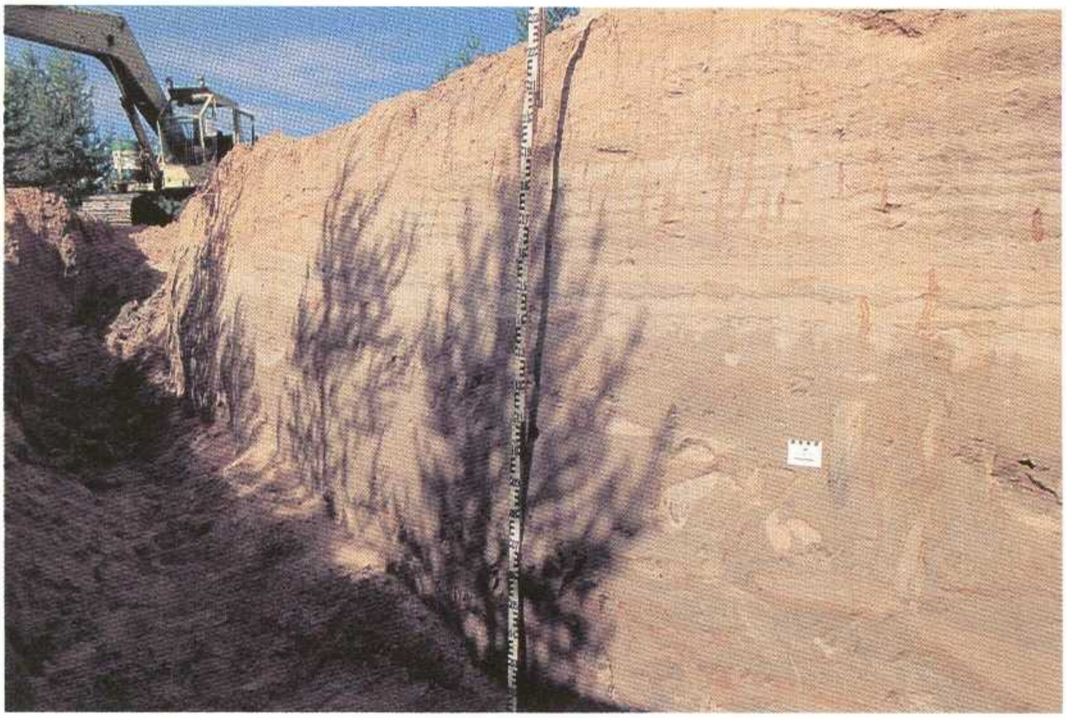


Figure 47. Trench dug in strongly deformed silty and fine-sandy sediments (lower half of the section) at Svartbergsbäcken (site 19). The deformed bed is covered by undisturbed sand and silt with slightly rippled and laminar layering respectively. The deformed sediments have a much tighter packing compared to the undeformed. The deformations are thought to be due to seismic shock resulting in compaction, liquefaction and dewatering of the sediments during the build up of the sequence. Photo: R.L. 1990.

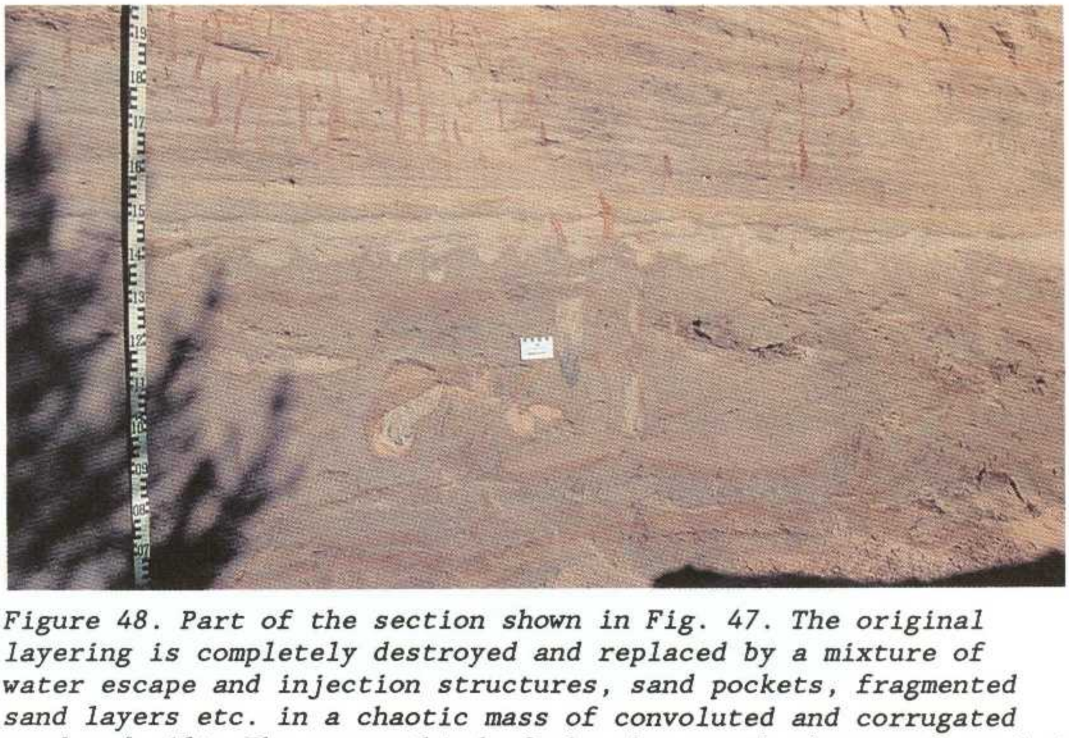


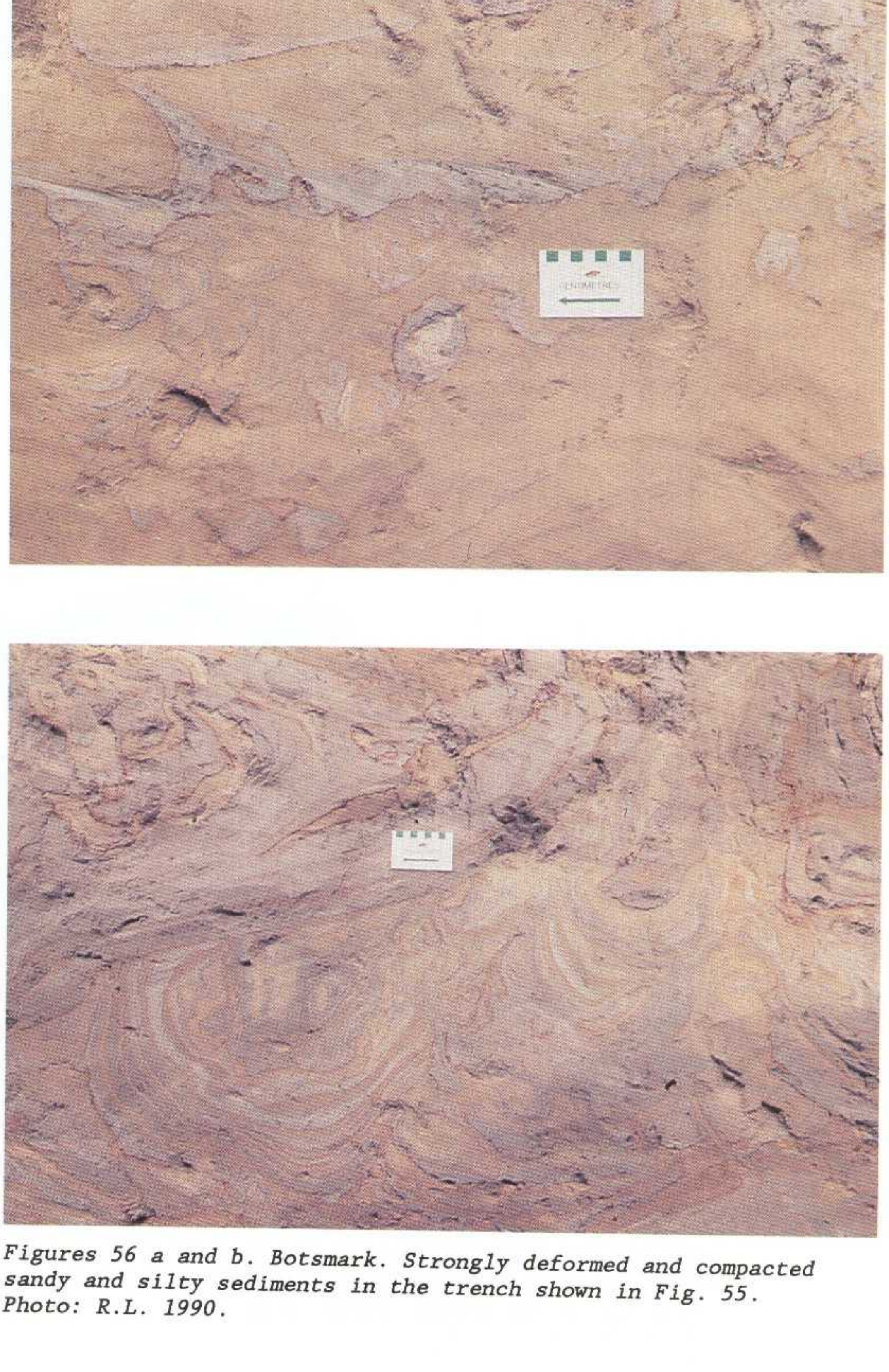
Figure 48. Part of the section shown in Fig. 47. The original layering is completely destroyed and replaced by a mixture of water escape and injection structures, sand pockets, fragmented sand layers etc. in a chaotic mass of convoluted and corrugated sand and silt. The upper third of the photograph shows undisturbed layering. Photo: R.L. 1990.

Figure 49. Close-up of the central part of Fig. 48. Note gravitational sorting of heavy minerals and lighter particles in the sand pocket to the right of the scale. Photo: R.L. 1990.

Figure 50. Strongly contorted silt and fine-sand at Svartbergsbäcken (part of the trench shown in Fig. 47). The covering sand is undisturbed. Photo: R.L. 1990.

Figure 51. Water escape and "fill in" structures at the base of the strongly deformed bed at Svartbergsbäcken. These and similar features show that the deformed bed is "rooted" in the sandy deposits on which it is resting and is not merely the result of slumping or gliding. Photo: R.L. 1990.

Figure 55. Trench dug through deformed sandy and silty glacial sediments covered by laminated (varved) silty clay at Botsmark some 50 km north of Umeå. The thick sand sheet between the clay and the deformed sediments below is interpreted to represent the fall-out from turbulent water in connection with earth tremor and faulting in the region. Photo: R.L. 1990.



Figures 56 a and b. Botsmark. Strongly deformed and compacted sandy and silty sediments in the trench shown in Fig. 55. Photo: R.L. 1990.

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[2]MBT Tecnologia Ambiental, CENT, Cerdanyola, Spain
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[2]SGAB, Uppsala
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[1]Conterra AB
[2]Sveriges Geologiska AB
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[2]Chalmers Institute of Technology
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