

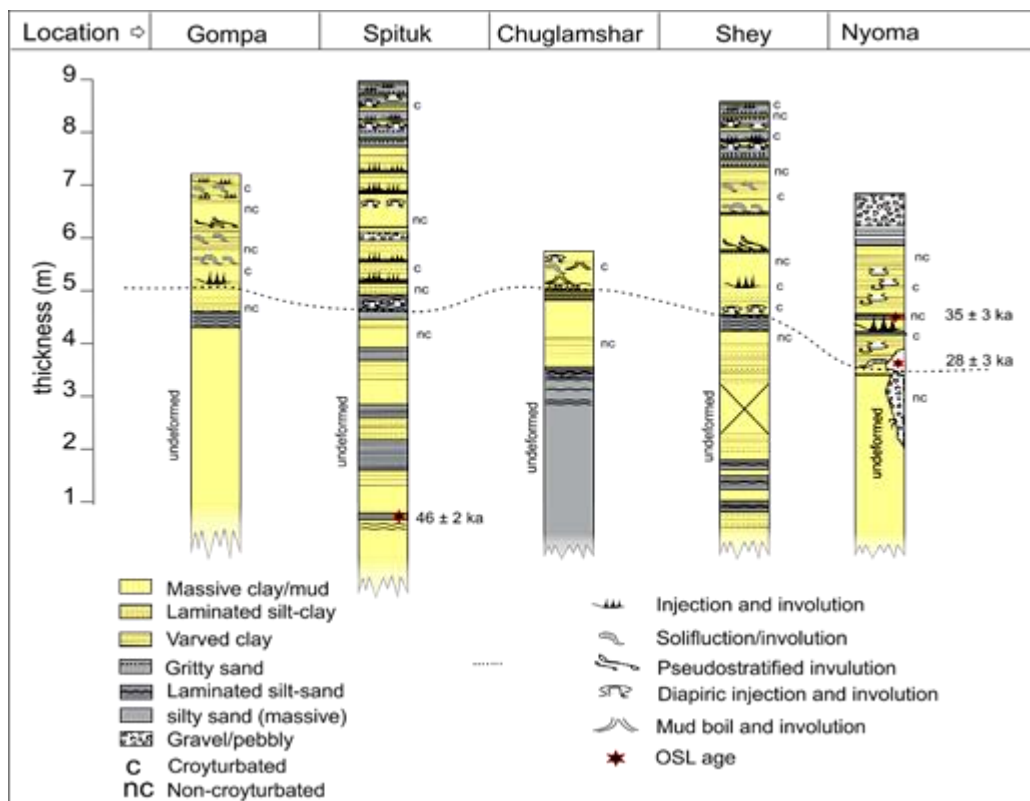
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## Widespread and Multiple Cryoturbation Episodes during Marine Isotopic Stage-3 (MIS-3) Terminus: Evidence from the Upper Part of Palaeolake Sediments, along Indus River, in Leh and Nyoma Area, Ladakh, India

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Late Quaternary fluvio-lacustrine sequences in and around Leh and Nyoma areas, Indus river valley, Laddakh are important, climate-controlled terrestrial sedimentary records of interglacial-glacial cycles (ca. 79 to >35 ka). These sediments exhibit some uncommon, well-preserved and well-distinguishable relict features of the cryoturbation which are preserved in the upper part of fluvio-lacustrine terrace sections along Indus River at several places. These features occur at two to five stratigraphic levels in the upper 2 to 6m of the laminated clay and sandy layers. The cryoturbated layers are conspicuously bounded by undisturbed strata and gives false impression of siesmites. The features occur as (i) Injection diapirs with involutions, (ii) Solifluction, (iii) Mud boils, (iv) Pseudostratified involution, and (v) Injection (Fig. 1). One or more of such layers are recorded in almost all studied sections preserved around Shey, Spituk, Chuglamshar, Palam and Nyoma localities in Indus valley. Their number and morphological features vary, depending on the granulometry, moisture content and frost susceptibility gradient. The morphological, sedimentological characters and widespread non-random occurrence of cryoturbation suggests existence of atleast five short term multiple cold and warm climate phases (freeze-thaw cycles) and/or rapid environmental changes in the region during terminus of last interglacial (MIS-3) (46 ka to <35 ka).



*Figure 1: Synthesis of Palaeolake aggradation and during terminus part of MIS-3 (interglacial) and disposition of cryoturbation features in Fluvio-lacustrine sediments at different localities in Leh and Nyoma, Indus Valley, Ladakh, India*

