irregular stratification

Erin Roy

TABLE OF CONTENTS

Convolute Bedding and Lamination

- Convolute lamination is a common fold structure where the sediment deforms soon, or immediately after the deposition of the host bed
    - Sediment deposits into laminations (super thin beds) and then is deformed by strong forces such as a turbidity current
- “Optimal window of average grain size and mud content parameter space, within which convolute lamination develops”
- Convolute bedding occurs before the sediment has been lithified

Post depositional modification of sedimentary layers, 2015, Blogspot.com, https://geologylearn.blogspot.com/2015/06/post-depositional-modification-of.html#google_vignette (accessed September 2025).

Flame Structures

- Flame structures are formed when water-saturated mud is overlain by denser sand.
  - The mud squishes up, out of the way of the sand.
- They are called flame structures, not because they are formed by flames but because they resemble flames! (Enter gasps here)
- Flame structures tend to form between ball and pillow structures

Way-up structures – Historical Geology, 2020, Opengeology.org, https://opengeology.org/historicalgeology/tools-of-historical-geology/way-up-structures/ (accessed September 2025).

Bed & Pillow Structures

- Typically form along the same sand and mud deposition that produces flame structures
- They form when seismic activity causes sandy sediment to lose its strenc]gh and act like a liquid, causing the denser sand to sink into the less dense mud.
- Similar to Dish and Pillow structures, usually forming below them

Way-up structures – Historical Geology, 2020, Opengeology.org, https://opengeology.org/historicalgeology/tools-of-historical-geology/way-up-structures/ (accessed September 2025).

Dish & Pillow Structures

- Formed by the forced vertical escape of water through sediment layers
  - original sediment deposition is rapid
  - Seismic activity triggers liquefaction of sediment
  - change in density along with the seismic activity forces water upward to create the dish and pillar patterns
- Dish and Pillow tend to form above ball and pillow structures

zsylvester, 2008, Dish structures: Hindered Settling, https://hinderedsettling.com/2008/02/23/dish-structures/ (accessed September 2025).

Soft-sediment deformation and dewatering structures, 2025, Ualberta.ca, https://sites.ualberta.ca/~jwaldron/gallerypages/softsed.html (accessed September 2025).

Sources

Gladstone, C., Harry, Woodcock, N.H., Pritchard, D., and Hunt, J.E., 2017, The formation of convolute lamination in mud-rich turbidites: Sedimentology, v. 65, p. 1800–1825, doi:https://doi.org/10.1111/sed.12447.

4.4: Erosional and Post-Depositional Structures, 2023, Geosciences LibreTexts, https://geo.libretexts.org/Courses/SUNY_Potsdam/Sedimentary_Geology%3A_Rocks_Environments_and_Stratigraphy/04%3A_Sedimentary_Structures/4.04%3A_Erosional_and_Post-Depositional_Structures (accessed September 2025).

61.2: Sedimentary way-up structures, 2023, Geosciences LibreTexts, https://geo.libretexts.org/Bookshelves/Geology/Historical_Geology_(Bentley_et_al.)/61%3A_(Tools_of_the_Trade)_Way-up_structures/61.02%3A_Sedimentary_way-up_structures (accessed September 2025).

Way-up structures – Historical Geology, 2020, Opengeology.org, https://opengeology.org/historicalgeology/tools-of-historical-geology/way-up-structures/ (accessed September 2025).