

MOLASSE OF FORELAND BASINS: THE ELUSIVE MODEL

A.D. MIALL

Department of Geology

University of Toronto

Mining Building

170 College Street, Toronto, Ontario M5S 1A1

Molasse is typically defined as a syntectonic to post-tectonic wedge of nonmarine to shallow marine sediment filling a foreland basin that is floored by continental crust and flanked by the uplifted fold-thrust belt from which the sediment was derived. However, this definition encompasses so much variability in basin architecture and tectonic setting as to render the term meaningless.

The type molasse (Cenozoic of the Alps) and some other major molasse wedges (e.g., Cenozoic Siwalik Group of the Indo-Gangetic Plain; Cenozoic of Taiwan) were formed in front of a volcanic arc on a subducting continental plate. Other wedges (e.g., Laramide molasse of Alberta and the Rocky Mountain States, Old Red Sandstone of Anglo-Welsh Cuvette) occupy a retro-arc position. The term 'foreland basin' has been applied to both types of basin.

Complexities are introduced by partial or progressive-oblique suture of continental plates leading to clastic wedges that are diachronous along strike (e.g., Arctic Melville Island Group, Himalayan molasse) and show longitudinal paleocurrent trends which may reverse as plate configurations change (e.g., Alberta and Alpine molasse).

Other plate settings can produce similar nonmarine clastic wedges flanking compressional orogens, including transgressive transform faults (e.g., modern Canterbury Plain of New Zealand), fore-arc basins (e.g., Irrawaddy Valley of Burma; Cook Inlet, Alaska), and some intraplate settings (e.g., Early Tertiary of the eastern Canadian Arctic).

In conclusion, the depositional environments, wedge geometry and basin configuration are not unique to molasse. What, therefore, does the term molasse tell us?