

Complex Clinoform Development in a Greenhouse Active Margin – Tyee Forearc Basin, Oregon

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Late Early Eocene to Middle Eocene Tyee Basin-fill in the Coast Range of Oregon is a sand-rich forearc basin succession. Formation of the Tyee Forearc Basin can be related to subduction of oceanic Farallon plate under the North American plate. Fluvial and deltaic sandstones, muddy slope deposits with slope-channel sandstones and thick, extensive submarine fan sandstones of Tyee Basin are exposed over an area of more than 10000 square miles in western Oregon. Tyee Basin-fill is characterized by its extremely thick and extensive deep water fan succession. Despite the complex geometry of the basin fill, well exposed continental, shelf/deltaic, deep-water slope and basin-floor successions in Tyee Basin make it a very suitable place for studying source to sink distribution of coarse sediment. Accurate reconstruction of the basin-fill geometry is extremely important for understanding the sediment distribution pattern in Tyee Basin and for explaining the origin of its unusually thick basin floor fan component that was deposited under Early Eocene Greenhouse climatic conditions. A reconstruction of the Tyee Basin fill, in terms of several prograding/aggrading clinoforms, was attempted using detailed outcrop study along several strike- and dip-oriented transects in the Coast Range of Oregon. Reconstruction using field data including extensive paleocurrent information suggests that high sediment supply (controlled by tectonics and Greenhouse climatic condition) and tectonically controlled initial configuration of the basin were the most important factors that contributed to the development of the sediment distribution pattern observed in Tyee Basin including the accumulation of very thick sand-rich deep-water fan succession.