Geophysical Research Abstracts
Vol. 17, EGU2015-15197-1, 2015
EGU General Assembly 2015

The Stratigraphic Expression of Submarine Channel-Lobe Transitions: An Outcrop Example from Southern Chile

Erin A. L. Pemberton (1), Stephen M. Hubbard (1), Andrea Fildani (2), Brian Romans (3), and Svetlana Kostic (4)

(1) Department of Geoscience, University of Calgary, Calgary, AB, Canada, (2) Statoil Research Center, Austin, TX, USA, (3) Department of Geosciences, Virginia Tech, Blacksburg, VA, USA, (4) Computational Science Research Center, San Diego State University, San Diego, CA, USA

The stratigraphic expression of sediment-laden gravity flows transitioning from deep-sea submarine channel to less-confined fan lobe is poorly constrained, motivating investigation of outcropping channel-lobe transition zone and channel fills in the Magallanes Basin, southern Chile. We hypothesize that turbidity currents moving from a high-slope confined setting (channel) into a lower slope unconfined setting (lobe), expand laterally and, under the right conditions, undergo internal hydraulic jumps. The Cretaceous strata examined are characterized by a variety of architectural elements in close juxtaposition both laterally and stratigraphically, including: (a) low aspect ratio channelform bodies attributed to slope channel fill; (b) high aspect ratio channelform bodies interpreted as the deposits of weakly-confined turbidite channels; (c) lenticular sedimentary bodies considered to represent the infill of laterally amalgamated scours; (d) discontinuous channelform bodies representing isolated scour fills; and (e) cross-stratified positive relief sedimentary bodies, which record upslope migrating depositional barforms.

The ephemeral nature of settings characterized by flow expansion (i.e. channel-lobe transition zone), as well as the propensity for scour and sediment bypass, yields extensive architectural variability in the stratigraphic record. Net-erosional and net-depositional cyclic steps play a fundamental role in the formation, filling, and maintenance phases of channel to lobe transition areas where high gradients support the development of densimetric Froude-supercritical turbidity currents; abrupt slope breaks can, under the right conditions, promote hydraulic jumps and possibly the spontaneous evolution of an erodible seabed into cyclic steps. Along these longitudinal profiles, both the formation of highly composite stratigraphic surfaces, as well as geomorphic surfaces, are passed into the rock record. This yields less repeated stratigraphic patterns than those reported from channel- or lobe-dominated units deposits up- or down- dip of expansion zones.