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# Recent turbidity current activity in sediment-starved submarine canyons (Northwestern Gulf of St. Lawrence, Eastern Canada)

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Submarine canyons are known to be main conduits for the transport of sediments to deep-sea basins, mostly by turbidity currents. Turbidity currents flowing in submarine canyons are mostly triggered by hyperpycnal flows, small to large slope failures and advection of shelf sediment offshore. In these contexts, sediment supply is necessary to maintain canyon activity over time. In 2007, a high-resolution mapping of small-scale submarine canyons offshore Pointe-des-Monts (NW Gulf of St. Lawrence, Eastern Canada) revealed a series of incisions characterized by the presence of numerous confined crescentic bedforms. The repeat mapping of the canyons in 2012 and 2015 revealed that the bedforms migrated upslope, indicating that they are cyclic steps produced by supercritical flows. Surprisingly, the comparison of multibeam surveys did not show any evidence of slope failures that could have triggered the turbidity currents responsible for recent bedform migration. Additionally, the rocky shores and coastal shelf do not supply sediments to these canyons, thus excluding turbidity current triggers such as advection of shelf sediments or hyperpycnal flows. In this context, we suggest that hydrodynamic processes are responsible for suspending in-situ sediments, which then may flow as turbidity currents when density of the water-sediment mixture is high enough. ADCPs deployed for 3,5 months during the summer of 2015 revealed along-canyon currents following tidal cycles with speeds up to 0.4 m/s, which were not strong enough to produce bedform migration. Therefore, the currents responsible for bedforms occur during infrequent events or during winter conditions, which both require longer instrument time-series to be observed.