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Novel cold Seep Habitat along the Hikurangi Margin (New Zealand)

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Continental margins are one of the largest global reservoirs of methane, containing an estimated 500-2500x10^{15} grams carbon (Milkov 2004). However, most methane released from these reservoirs does not reach the overlying water column, because of microbial consumption as it passes through the sedimentary matrix. It is thought that metazoan communities play a limited role in the flux of methane from the seafloor but here we report on a novel cold seep habitat where metazoans affect the input of methane into the hydrosphere. This habitat is dominated by dense beds of ampharetid polychaetes and releases 207$\pm$66 mmol m^{-2} d^{-1} methane; 41 times greater than maximum seepage fluxes from adjacent areas populated by typical seep fauna (0.9 – 5.1 mmol m^{-2} d^{-1}) and about 18 times higher than those measured at cold seeps at Hydrate Ridge, Cascadia subduction zone, and at a mud mound off Costa Rica. Although members of the family Ampharetidae have been reported from other cold seep sites and whale falls, this is to the best of our knowledge the first record where these polychaetes constitute the key fauna of a cold seep environment. We hypothesize that this habitat represents an early stage of metazoan colonization at seeps creating a pathway for high microbial methane turnover and associated carbonate precipitation, which expedites the transition from a soft sediment to hard substrate seep fauna.