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Branching of the Faroe Bank Channel overflow

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The overflow of cold and dense water from the Nordic Seas through the Faroe Bank Channel (FBC-overflow) is one of the main sources for the deep branch of the AMOC. The transport of the FBC-overflow has been measured at the FBC sill for more than 20 years and has shown to be very stable with a mean kinematic volume transport of 2.2 Sv. The channel is the deepest passage between the Nordic Seas and the rest of the world ocean and the FBC-overflow is the densest overflow branch although entrainment of Atlantic water subsequently makes it less dense than the overflow through the Denmark Strait. Traditionally, it has been assumed that the entrainment would increase the volume transport of dense water ($\sigma\theta$ > 27.8 kg m-3) up to or above the double of the transport at the FBC sill. Nevertheless, efforts to measure the volume transport of modified FBC-overflow downstream from the channel have generally failed to confirm this assumed doubling of the transport. From historical hydrographic data, there is, however, evidence that the FBC-overflow plume splits into (at least) two separate branches downstream from the channel. One of these branches continues along the traditional path towards the slope south of Iceland, where it has been studied in several experiments. The other branch flows more southwards into the depth of the Iceland Basin, apparently confined by a channel on the northern slope of the Rockall-Hatton Plateau that reaches depths of at least 1700 m. The transport of this branch has not, to our knowledge, been quantified. Here, we present results from recent hydrographic investigations close to the splitting region that show the likely originator of the southern branch as a thin, presumably very rapid, bottom flow forming intermittently. We also discuss the splitting process and formation of the southern branch.