Accumulation and redistribution of ^{137}Cs on floodplains along the Abukuma River

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A portion of sediment-borne ^{137}Cs in river water accumulates on floodplains during high-flow events and becomes a source of secondary contaminations in subsequent events. This study aims to elucidate processes of ^{137}Cs accumulation / redistribution on floodplains and presents the ^{137}Cs inventory and depth distribution in deposited sediments. The sediment cores were taken in 2018 and 2019 at six floodplain cross-sections, located along the Abukuma River in Nihonmatsu (NIH), Fukushima (KUR), Date (FUS), Marumori (MAR), Kakuda (KAK), and river mouth area in Iwanuma (Mouth). The mean ^{137}Cs inventory obtained by sampling campaigns in October 2018 at NIH, KUR, FUS, MAR, KAK, and Mouth were 150 kBq m^{-2} (n = 2), 600 kBq m^{-2} (n = 3), 490 kBq m^{-2} (n = 2), 270 kBq m^{-2} (n = 2), 90 kBq m^{-2} (n = 2), and 40 kBq m^{-2} (n = 1), respectively. These values were 1.2-9.1 times higher than those estimated by 6th airborne survey at each point, suggesting secondary accumulation of ^{137}Cs. The ^{137}Cs inventory and maximum ^{137}Cs concentrations in sediment depth profile tended to be high at the sampling points, located on the highest floodplain level above the river channel within each floodplain cross-section. The mean ^{137}Cs inventory obtained by sampling campaigns in October and November 2019 at NIH, KUR, FUS, MAR, KAK, and Mouth were 180 kBq m^{-2} (n = 2), 540 kBq m^{-2} (n =2), 410 kBq m^{-2} (n = 1), 120 kBq m^{-2} (n = 2), 420 kBq m^{-2} (n = 3), and 46 kBq m^{-2} (n = 1), respectively. Although ^{137}Cs inventory on the floodplains are not so different, depth distributions of ^{137}Cs in the deposited sediment changed from those of 2018. These results suggest that an extreme flood triggered by Typhoon *Hagibis* in middle of October 2019 resulted in a substantial redistribution of ^{137}Cs at Abukuma fluvial system.

Keywords: Abukuma River, floodplains, sediment dynamics