

Develop FOD benthic landers for hadal science

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A movable laboratory for hadal zone research are under construction by the Hadal Science and Technology Research Center(HAST) of Shanghai Ocean University(SHOU). As part of the movable laboratory, three FOD benthic landers have been designed and built under the corporation of HAST and Oceanlab of the university of Aberdeen. The first lander is designed to be a multi-function lander that can carry middle payload; the second lander is design to be a heavy weigh lander for sediment sampling and in situ measurement; the third lander is a light weight lander used as a deep sea creature trap now. During Dec. 3 2016 to Feb. 14 2017, HAST organized its first Mariana cruise, and all three landers went to sea trial on this cruise. Three landers were successfully deployed to challenger deep and worked as promised. FOD data and samples were taken by three landers, including CTD data, images of deep sea creature activity, sediment samples, DO data and deep sea creature samples. The weather window is so narrow that three landers are not able to deploy to FOD again, and according to the schedule of the cruise, the RV has to head to NBT to test the hybrid autonomous and remotely operated vehicle (ARV). On the way to NBT, three landers were deployed to the deepest point of Mussau trench, and took the data and samples of this point. When the RV reached NBT and the tests of the ARV were finished, the cruise went to the stage of the scientific investigation of the middle, east and west cross sections of NBT. During this stage, data and samples of less than 6000 meters depth were taken by the on deck equipments of the RV, and three landers were deployed to the deepest point of each cross section to take data and samples. On this cruise, three landers worked reliably, but several problems were also found. The success, problems, and experience on developing these FOD landers are introduced in this presentation.