



Observation of water-mass characteristics in the "Challenger Deep" by using 7000m-level gliders

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Trench (depth > 6000m) is virtually unexplored and most difficult to reach in the ocean, which is characterized by complete darkness and extremely high pressure. By help of two 7000m-level underwater gliders, it enables us to explore the physical environments in the world deepest trench—"Challenger Deep" of the Mariana Trench in the cheapest way. The glider is equipped with 7000m-level SBE-37 CTD, hence it can measure trench temperature, salinity and density. The two gliders made 102 profiles (up and down) and sailed about 1500 km (in horizontal) totally in the trench. The results show that the water-mass are characterized as low temperature, high salinity and density in the trench which come from deep water of South Ocean. At 4000m depth, the isothermal, isohaline and isopycnal all show the north-south gradients in which low temperature, high salinity and density are distributed at south side. However, they show east-west gradients at 7000m depth indicating the mixing process of water-mass are different in different depth level. The geostrophic current derived from CTD data show a cyclonic circulation in the "Challenger Deep". This sense of circulation also was observed in other trenches indicating it is common in a deep trench with closed geostrophic contours.