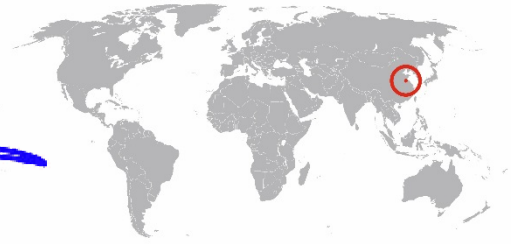




CCSD

Chinese Continental Scientific Drilling Project

Donghai, China



Goal & Scientific Objective

The objectives of the CCSD project were as follows: (1) to obtain multi-parameter profiles of a 5158 m deep borehole in the Sulu Terrane, (2) to reconstruct the composition and structure of a deep continental orogenic root, (3) to reveal subduction and exhumation processes of UHP metamorphic terranes, (4) to search deep life in the borehole and constrain fluid-rock interaction, and (5) to establish a long-term, natural laboratory for the study of crustal dynamics and the evolution of deep continental crust using the CCSD-MH.

Operational Achievements

Three prepilot holes (CCSD-PP1, -PP2, -PP3) were drilled earlier in time.

The main hole CCSD-MH was drilled in two phases and reached a depth of 5158 m.

An intense downhole logging and testing program was carried out during and after the active drilling phase. Aside logging by service companies, OSG logging did also partake.

Web & Media Resources

<http://www.ccsd.org.cn/English/index.htm>

<http://donghai.icdp-online.org/>

Timeline

1998 ICDP proposal submission

2001 – 2005 drilling operations

Principal Investigators

Zhiqin Xu, Chinese Academy of Geosciences

Bolin Cong, Chinese Academy of Sciences

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Data & Sample Access

China Geological Survey, Cores and Samples
Center of Land & Resources



CCSD Drilling in Donghai

Scientific Findings

Evidence of deep subduction of huge amount of supracrustal materials.

Apatite fission track analysis indicates an average uplift rate of ~ 35m/Ma during 89–30 Ma.

Crustal structure and pressure–temperature–time–deformation paths of the core samples and outcrop rocks indicate a dome-shaped nappe structure and syn-collisional exhumation of the HP and UHP slices in the Sulu Terrane.

About 20 species of bacteria and 4–5 species of archaea were identified of the CCSD-MH. Microbes show a great diversity, but the diversity decreases with depth. The deepest bacteria occur at 4406.49 m, which gives the bottom boundary for life under extreme conditions in a deep borehole.



Key Publications

Xu, Z.Q.; Yang, J.S.; Wang, C.S.; An, Z.S.; Li, H.B.; Wang, Q.; Su, D.C. (2017): Fifteen years of the Chinese Continental Scientific Drilling Program. *Scientific Drilling* 22 1-18. doi:10.5194/sd-22-1-2017

Wang, D.; Zhang, W.; Zhang, X.; Zhao, G.; Zuo, R.; Ni, J.; Yang, G.; Jia, J.; Yang, K.; Zhu, Y.; Xie, W.; Zhu, W.; Zhang, P.; Fan, L.; Ye, J.; Wang, Y. (2015): The China Continental Scientific Drilling Project. CCSD-1 Well Drilling Engineering and Construction. Springer Geology

Zhang, R.Y.; Jahn, B.M.; Liou, J.G.; Yang, J.S.; Chiu, H.Y.; Chung, S.L.; Li, T.F.; Lo, C.H. (2010): Origin and tectonic implication of an UHP metamorphic mafic-ultramafic complex from the Sulu UHP terrane, eastern China: Evidence from petrological and geochemical studies of CCSD-Main Hole core samples. *Chemical Geology* 276(1-2) 69-87

Xiao, Y.; Zhang, Z.; Hoefs, J.; Van Den Kerkhof, F. (2006): Ultrahigh-pressure metamorphic rocks from the Chinese Continental Scientific Drilling Project – II Oxygen isotope and fluid inclusion distributions through vertical sections. *Contributions to Mineralogy and Petrology* 152 443-458. doi:10.1007/s00410-006-0084-5

Zhang, Z.; Xiao, Y.; Hoefs, J.; Liou, J.G.; Simon, K. (2006): Ultrahigh pressure metamorphic rocks from the Chinese Continental Scientific Drilling Project: I. Petrology and geochemistry of the main hole (0–2,050 m). *Contributions to Mineralogy and Petrology* 152 421-441. doi:10.1007/s00410-006-0120-5