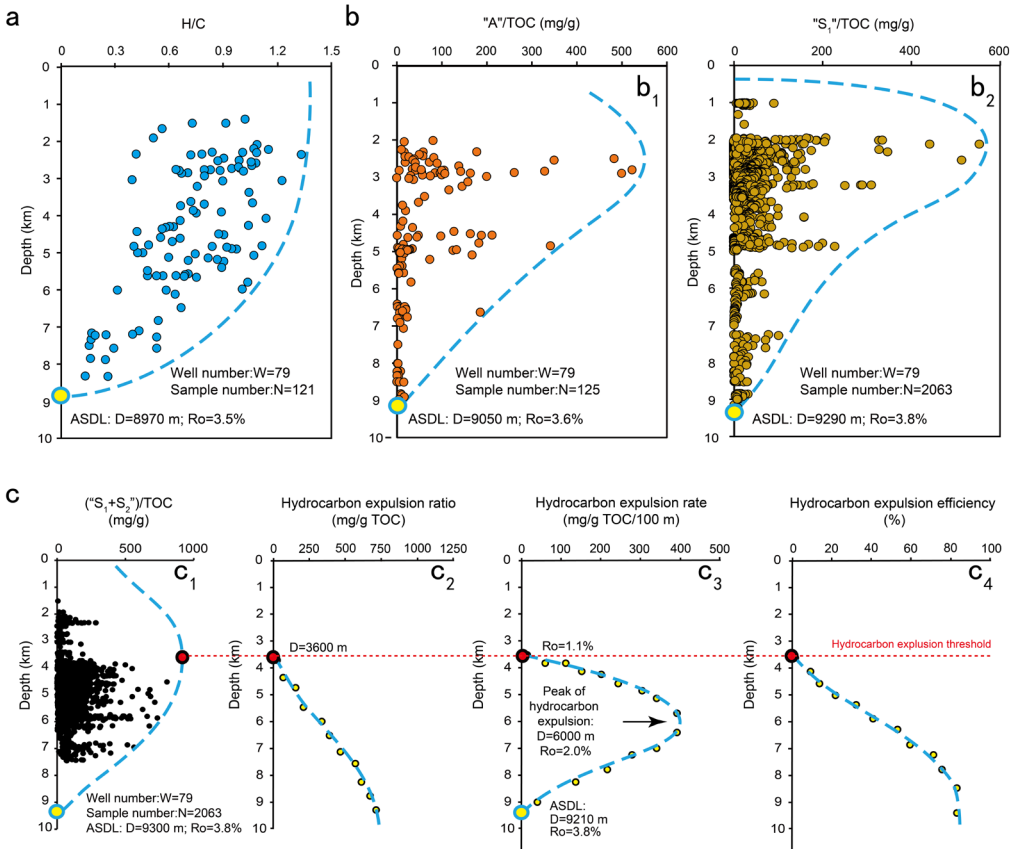

Fig. S1. The identification of Active Source Rock Depth Limit (ASDL) in the Tarim Basin in China using different indicators. a, the variation H/C ratios with depth and identification of ASDL. b1, the variation of residual hydrocarbon amounts ("A"/TOC) with depth and identification of ASDL; b2, the variation of residual hydrocarbon amounts ("S_1"/TOC) with depth and identification of ASDL. c1, the variation of hydrocarbon generation potential index ("S_1+S_2"/TOC) with depth and identification of ASDL; c2, the variation of hydrocarbon expulsion amount by a unit weight of organic matter (Qe) with depth and identification of ASDL; c3, the variation of hydrocarbon expulsion amount by a unit weight of organic matter during increasing depth of 100 meters (Ve) with depth and identification of ASDL; c4, the variation of hydrocarbon expulsion efficiency (Ke) with depth and identification of ASDL.

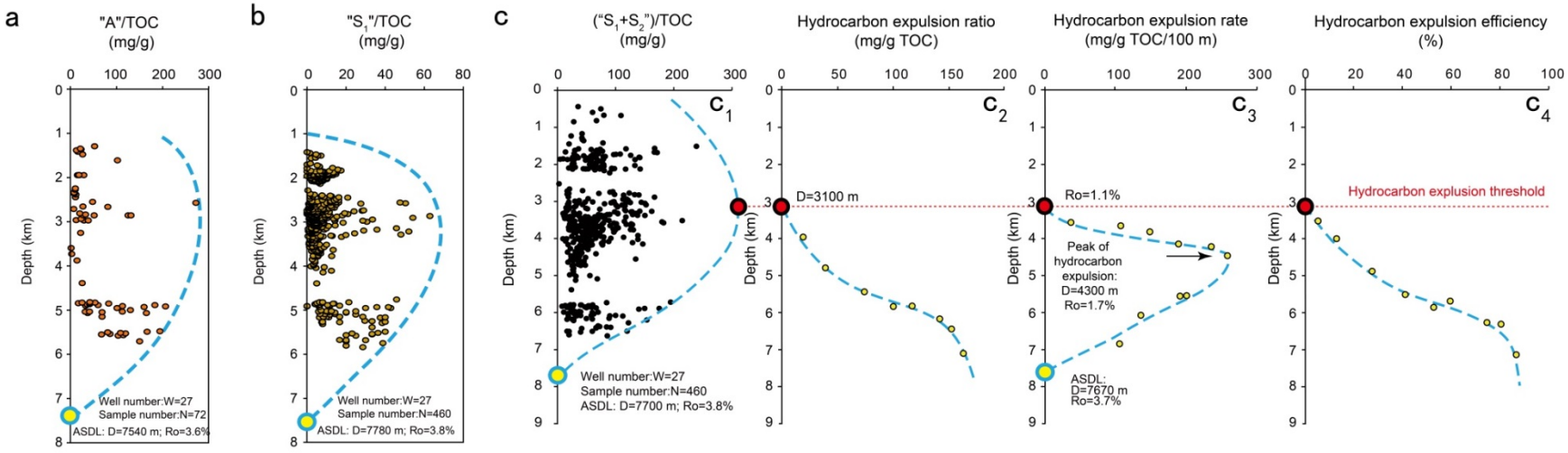

Fig. S2. The identification of ASDL in the Sichuan Basin in China using different indicators. a, The variation of residual hydrocarbon amounts ("A"/TOC) and identification of ASDL. b, The variation of residual hydrocarbon amounts ("S_1"/TOC) with depth and identification of ASDL. c1, the variation of hydrocarbon generation potential index ("S_1+ S_2"/TOC) with depth and identification of ASDL; c2, the variation of hydrocarbon expulsion amount by a unit weight of organic matter (Qe) with depth and identification of ASDL; c3, the variation of hydrocarbon expulsion amount by a unit weight of organic matter during increasing depth of 100 meters (Ve) with depth and identification of ASDL; c4, the variation of hydrocarbon expulsion efficiency (Ke) with depth and identification of ASDL.

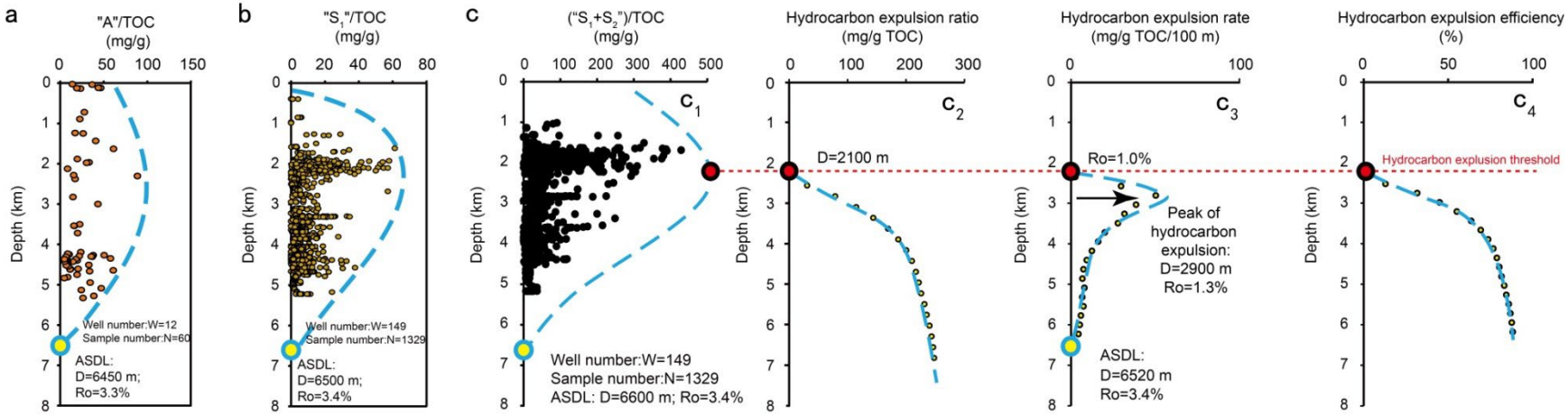

Fig. S3. The identification of ASDL in the Ordos Basin in China using different indicators. a, The variation of residual hydrocarbon amounts ("A"/TOC) and identification of ASDL. b, The variation of residual hydrocarbon amounts ("S_1"/TOC) with depth and identification of ASDL. c1, the variation of hydrocarbon generation potential index ("S_1+ S_2"/TOC) with depth and identification of ASDL; c2, the variation of hydrocarbon expulsion amount by a unit weight of organic matter (Qe) with depth and identification of ASDL; c3, the variation of hydrocarbon expulsion amount by a unit weight of organic matter during increasing depth of 100 meters (Ve) with depth and identification of ASDL; c4, the variation of hydrocarbon expulsion efficiency (Ke) with depth and identification of ASDL.

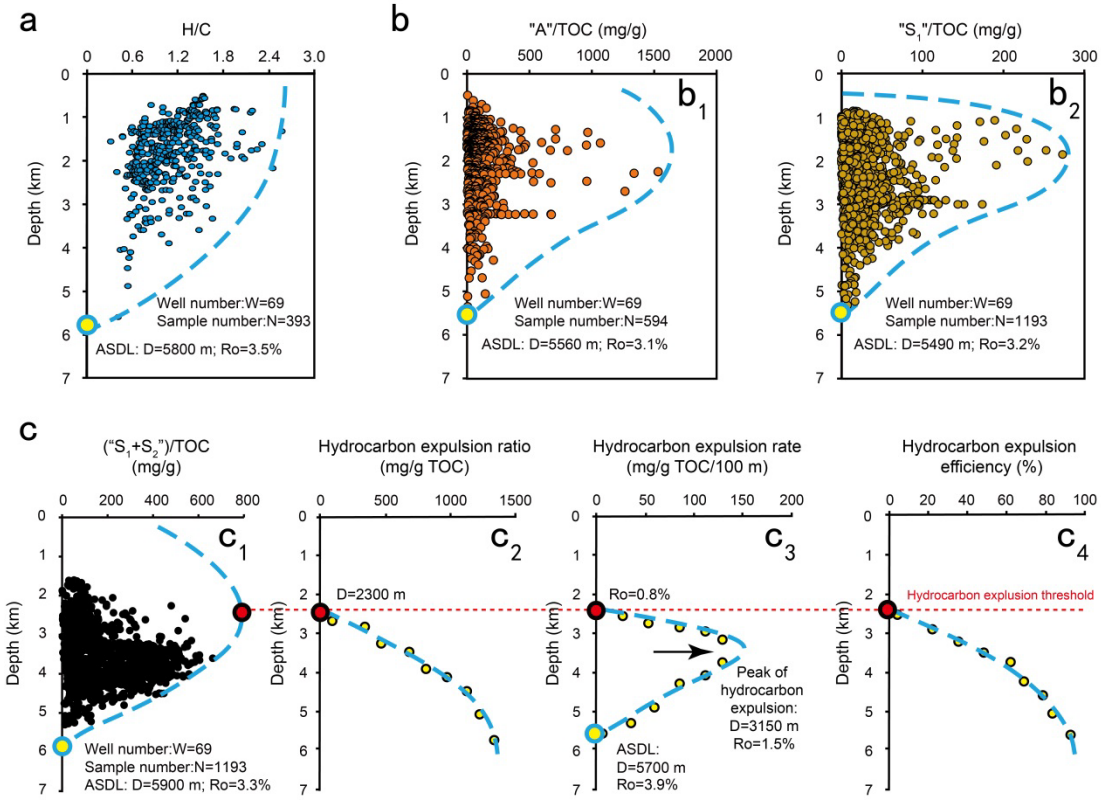

Fig. S4. The identification of ASDL in the Bohai Bay Basin in China using different indicators. a, the variation H/C ratios with depth and identification of ASDL. b1, the variation of residual hydrocarbon amounts ("A"/TOC) with depth and identification of ASDL; b2, the variation of residual hydrocarbon amounts ("S_1"/TOC) with depth and identification of ASDL. c1, the variation of hydrocarbon generation potential index ("S_1+ S_2"/TOC) with depth and identification of ASDL; c2, the variation of hydrocarbon expulsion amount by a unit weight of organic matter (Qe) with depth and identification of ASDL; c3, the variation of hydrocarbon expulsion amount by a unit weight of organic matter during increasing depth of 100 meters (Ve) with depth and identification of ASDL; c4, the variation of hydrocarbon expulsion efficiency (Ke) with depth and identification of ASDL.

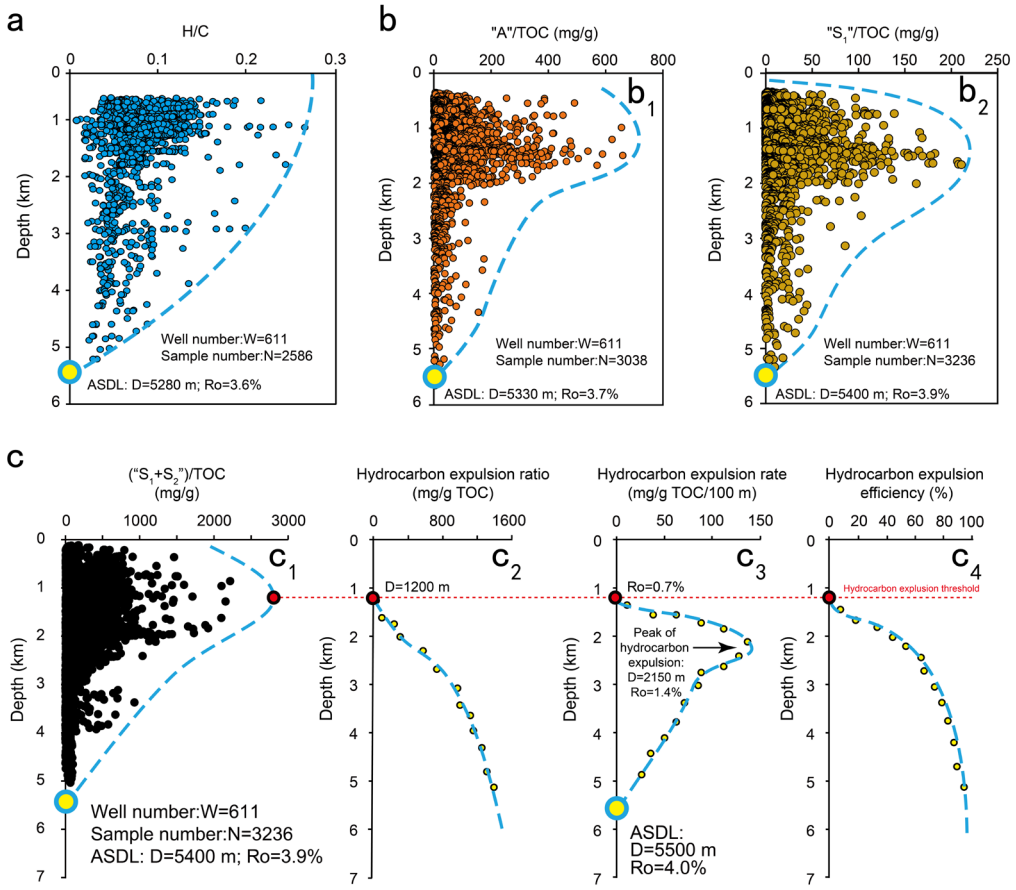

Fig. S5. The identification of ASDL in the Songliao Basin in China using different indicators.

a, the variation H/C ratios with depth and identification of ASDL. b1, the variation of residual hydrocarbon amounts ("A"/TOC) with depth and identification of ASDL; b2, the variation of residual hydrocarbon amounts ("S_1"/TOC) with depth and identification of ASDL. c1, the variation of hydrocarbon generation potential index ("S_1+ S_2"/TOC) with depth and identification of ASDL; c2, the variation of hydrocarbon expulsion amount by a unit weight of organic matter (Qe) with depth and identification of ASDL; c3, the variation of hydrocarbon expulsion amount by a unit weight of organic matter during increasing depth of 100 meters (Ve) with depth and identification of ASDL; c4, the variation of hydrocarbon expulsion efficiency (Ke) with depth and identification of ASDL.

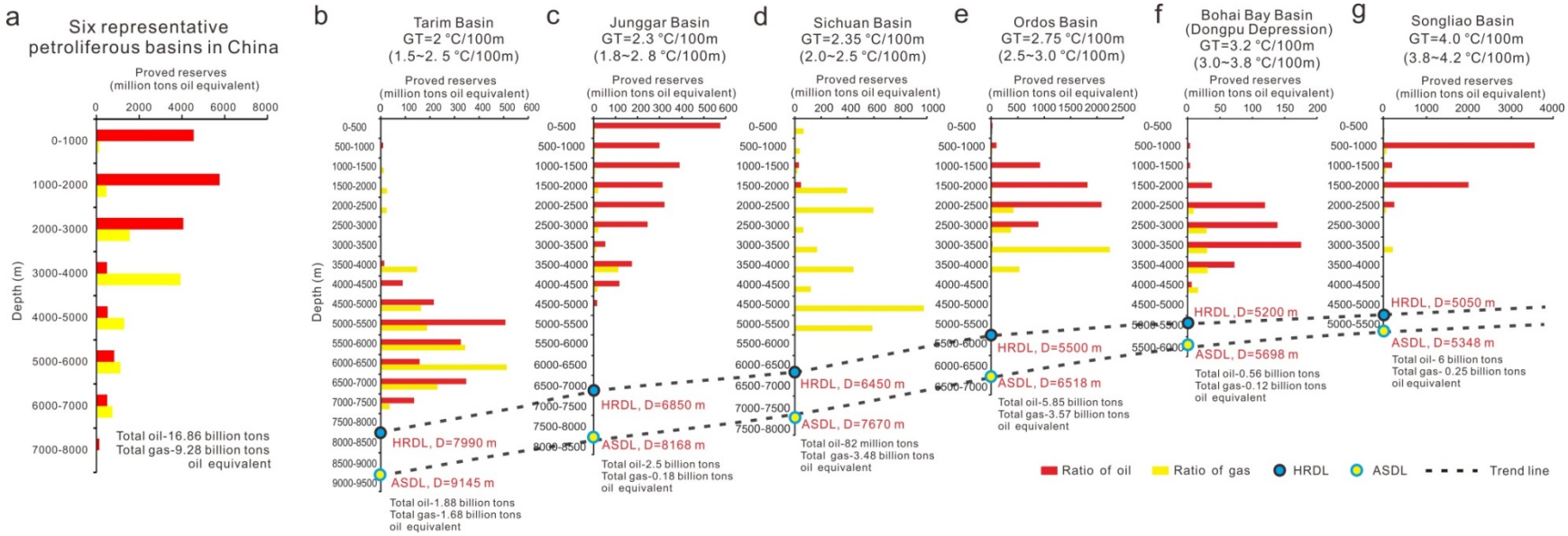

Fig. S6. The vertical distribution characteristics of proved hydrocarbon reserves and their relationships with ASDLs and HRDLs in six representative basins in China. a, summation of six representative basins in China. b, Tarim Basin. c, Junggar Basin. d, Sichuan Basin. e, Ordos Basin. f, Bohai Bay Basin. g, Songliao Basin. HRDL represents the hydrocarbon reservoir depth limit. The average ASDL value of each basin shown in this figure is obtained from various kinds of indicators as presented in Table 2.