Table 1 Statistical table of 14C dating data in Jizhong Depression

| Number | Location (number of samples) | Well depth (m) | Wellhead temperature (°C) | Thermal reservoir | δ13C（‰） | 14C（pmc） | 14C age (104a) | “Tamers”corrected age（104a） | “Pearson” corrected age（104a） | δD (‰, SMOW) | δ18O (‰, SMOW) | Deuterium excess parameter (*d*) | Data source |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | Urban area of Rongcheng County (14) | 1138 to 2800 | 48.5 to 69 | Wumishan Formation of Jixian System | -4.2 to -2.3 | ＜0.44 | >4.35 | >3.92 | 2.21 to 3.03 | -81.28 to -73.04 | -9.28 to -8.24 | -7.96 to 0.06 | ① |
| 2 | West of Rongcheng County (2) | 1900 to 1928 | 42 to 52 | Wumishan Formation of Jixian System | -7.2 to -4.2 | 0.74 to 1.80 | 3.23 to 3.94 | 2.76 to 3.49 | 1.85 to 3.03 | -76.46 to -73.94 | -10.03 to -9.13 | -0.90 to 3.78 | ① |
| 3 | Northwest corner of Anxin County D19 (1) | 4021 | 80 | Gaoyuzhuang Formation of Jixian System | -2.9 | 2.96 | 2.83 | 2.38 | 1.13 | -71.38 | -7.85 | -8.58 | ① |
| 4 | West of Ma Village, Anxin County D35 (1) | 3853 | 109.2 | Wumishan Formation of Jixian System | -3.5 | 2.55 | 2.95 | 2.48 | 1.41 | -71.99 | -8.44 | -4.47 | ① |
| 5 | South of Haozhuang Village, Anxin County D34 (1) | 4500 | 123.4 | Gaoyuzhuang Formation of Jixian System | -3.4 | 1.60 | 3.32 | 2.85 | 1.77 | -70.65 | -7.74 | -8.73 | ① |
| 6 | Nanquantou Village, Gaoyang County (1) | 3230 | 100 | Wumishan Formation of Jixian System | -1.3 | 0.7 | 3.99 | 3.54 | 1.67 | -69.09 | -5.54 | -24.77 | ① |
| 7 | Southeast of Tunzhuang, Boye County (2) | 3760 to 3860 | 100 | Wumishan Formation of Jixian System | -0.6 to -0.3 | ＜0.44 to 0.51 | 4.24 to >4.35 | 3.81 to 3.99 | 0.83 to 1.28 | -71.65 to -71.22 | -6.46 to -6.12 | -22.26 to -19.97 | ① |
| 8 | Anguo City (5) | 3100 to 3915 | 100 to 105 | Wumishan Formation of Jixian System | -6.4to-1.4 | ＜0.44 to 0.72 | 3.97 to >4.35 | 3.52 to >4.10 | 2.10 to 3.16 | -75.13 to -74.15 | -9.9 to -6.7 | -20.81 to 4.43 | ① |
| 9 | Anxin County (8) | 1380 to 2085 | 42 to 61 | Neogene Guantao Formation | -12.1 to -2.7 | ＜0.44 to 1.30 | 3.49 to >4.35 | 3.02 to >3.92 | 2.65 to 3.88 | -76.45 to -73.79 | -10.31 to -9.06 | -2.02 to 6.30 | ① |
| 10 | West of Anxin County (1) | 1670 | —— | Neogene Guantao Formation | -8.5 | 56.5 | 0.46 | —— | —— | -65.03 | -8.26 | 1.05 | ① |
| 11 | Liulizhuang Town, Anxin County (1) | 1725 | 65 | Neogene Guantao Formation | -8.9 | 0.9 | 3.74 | —— | 3.04 | -71.15 | -9.48 | 4.69 | ① |
| 12 | Tourism West Road, Anxin County (1) | Pumping well | —— | Quaternary | -10.1 | 71.67 | 0.27 | —— | —— | -71.6 | -9.62 | 5.36 | ① |
| 13 | Nanzhuang Village, Rongcheng County (1) | Pumping well | —— | Quaternary | -10.5 | 49.59 | 0.56 | —— | —— | -64.28 | -8.74 | 5.64 | ① |
| 14 | Tongkou Town, Anxin County (2) | Pumping well | —— | Quaternary | -11.1 to -10.3 | 11.8 to 17.8 | 1.72 to 1.39 | —— | 0.70 to 1.10 | -82.99 to -73.35 | -10.9 to -9.47 | 2.41 to 4.21 | ① |
| 15 | Qingyuan District, Baoding City (8) | 1540 to 2070 | 46 to 72 | Neogene + Paleogene | -7.2 to -4.6 | 0.54 to 2.6 | 2.93 to 4.19 | 2.48 to 3.76 | 1.84 to 3.29 | -74.98 to -71.64 | -10.03 to -8.39 | -4.91 to 5.62 | ① |
| 16 | Renqiu Bohai Petroleum Vocational College (1) | 1993 | —— | Neogene Guantao Formation | -8.5 | ＜0.44 | >4.35 | ＞3.94 | 3.60 | -73.04 | -8.93 | -1.60 | ① |
| 17 | Pangkou Town, Gaoyang County (1) | 2032 |  | Neogene Guantao Formation | -7.7 | ＜0.44 | >4.35 | ＞3.92 | 3.51 | -72.99 | -9.41 | 2.29 | ① |
| 18 | Wujiaying Village, Li County (1) | 1880 |  | Neogene Guantao Formation | -5.6 | 0.68 | 4.01 | 3.57 | 2.89 | -74.16 | -9.65 | 3.04 | ① |
| 19 | Lixian City District (3) | 2000 to 2005 |  | Neogene Guantao Formation | -7.3 to -5.6 | ＜0.44 | >4.35 | ＞3.92 | 3.25 to 3.47 | -75.15 to -74.11 | -10.13 to -9.7 | 3.49 to 5.89 | ① |
| 20 | Boye County District (2) | 1900 to 2000 |  | Neogene Guantao Formation | -5.8 to -5.7 | 0.47 to 0.50 | 4.23 to 4.31 | 3.83 to 3.89 | 3.16 to 3.22 | -74.7 to -72.62 | -9.68 to -9.64 | 2.42 to 4.82 | ① |
| 21 | Anguo City (15) | 1800 to 2000 | 60 to 72 | Neogene Guantao Formation | -7.8 to -2.5 | ＜0.44 to 0.78 | 2.74 to >4.35 | 3.45 to >3.92 | 2.58 to 3.30 | -76.48 to -74.07 | -10.51 to -8.98 | -2.86 to 7.21 | ① |
| 22 | Qibao Village, Dingzhou City (1) | 1600 | —— | Neogene Guantao Formation | -8 | 0.58 | 4.14 | 3.70 | 3.32 | -71.13 | -9.42 | 4.23 | ① |
| 23 | Xizhong Village, Dingzhou City (1) | 1500 | —— | Neogene Guantao Formation | -10.7 | 5.71 | 2.30 | 1.81 | 1.67 | -80.14 | -10.67 | 5.22 | ① |
| 24 | Xiaoning County District (2) | 2260 to 2295 | —— | Neogene Guantao Formation | -8.9 to -5.8 | ＜0.44 to 0.47 | 4.28 to >4.35 | 3.84 to >3.95 | 3.19 to 3.63 | -76.54 to -74.23 | -10.35 to -9.32 | 0.33 to 6.26 | ① |
| 25 | Anping County Distric (3) | 2035 to 2350 | —— | Neogene Guantao Formation | -8.8 to -5.6 | ＜0.44 to 0.66 | 4.04 to >4.35 | 3.59 to >3.92 | 3.25 to 3.60 | -76.74 to -76.57 | -10.43 to -10.26 | 5.51 to 6.72 | ① |
| 26 | Shenze County District (3) | 1400 to 1936 | —— | Neogene Guantao Formation | -8.0 to -5.8 | ＜0.44 | >4.35 | >3.92 | 3.27 to 3.54 | -76.93 to -75.78 | -10.55 to -10.12 | 5.18 to 7.47 | ① |
| 27 | Fourth Village, Xinzhen, Wen'an County (1) | 1800 | —— | Neogene Guantao Formation | -10.5 | ＜0.44 | >4.35 | >3.92 | 3.77 | -76.12 | -9.94 | 3.4 | ① |
| 28 | Wild hillside in Taihang Mountains (3) | Spring | —— | Bedrock | —— | —— | 0.06 to 0.15 | —— | —— | -67.17 to -60.48 | -9.21 to -8.36 | 5.67 to 6.51 | ① |
| 29 | Xiaotangshan, Beijing (1) | 125 | 54.6 | Jixian System | —— | —— | 2.44 | 2.10 | —— | —— | —— | —— | Lv (2004) |
| 30 | South of Xiaotangshan, Beijing (1) | —— | 42 | Cambrian System | —— | —— | 3.08 | 2.65 | —— | —— | —— | —— | Lv (2004) |
| 31 | Peking University (1) | 3168 | 59 | Wumishan Formation of Jixian System | —— | —— | 3.16 | 2.72 | —— | —— | —— | —— | Ke (2009) |
| 32 | North Beach, Haidian District (1) | 3326 | 53 | Wumishan Formation of Jixian System | —— | —— | 3.75 | 3.23 | —— | —— | —— | —— | Ke (2009) |
| 33 | Southeast of Beijing City (1) | —— | —— | Wumishan Formation of Jixian System | —— | —— | 1.94 | 1.67 | —— | —— | —— | —— | Ke (2009) |
| 34 | South of Beijing (1) | 3608 | 88 | Wumishan Formation of Jixian System | —— | —— | 2.00 | 1.72 | —— | —— | —— | —— | Ke (2009) |
| 35 | Liangxiang Town, Fangshan District (1) | 2800 | 72 | Wumishan Formation of Jixian System | —— | —— | 3.89 | 3.35 | —— | —— | —— | —— | Liu et al. (2015) |
| 36 | Fengheying, Beijing (1) | 3623 | 103 | Wumishan Formation of Jixian System | —— | —— | 3.33 | 2.86 | —— | -66.00 | -7.10 | 9.20 | Liu et al. (2015) |
| 37 | Langfang Petroleum Pipeline Bureau (1) | 1480 | 41 | Neogene Guantao Formation | —— | —— | 2.14 | 1.84 | —— | -79.20 | -10 | 0.8 | Zhang et al. (2013) |
| 38 | Tianjin Lizigu Farm (1) | 2850 | 68 | Jixian System | —— | —— | 1.85 | 2.40 | 1.85 | -73.91 | -9.88 | 5.13 | Yao (1995) |
| 39 | West of Tianjin Shanlingzi (1) | 1445 | 96 | Jixian System | -3.97 | 1.7 | 1.85 | 2.40 | 1.85 | -72.00 | -9.00 | 0 | Yao (1995) |
| 40 | Tianjin Shanlingzi (1) | 1349 | 75 | Jixian System | —— | —— | 0.62 | 0.80 | 0.62 | -72.90 | -8.75 | −2.9 | Yao (1995) |
| 41 | Tianjin Zhangdaokou (1) | 1405 | 77 | Jixian System | —— | —— | 1.77 | 2.30 | 1.77 | -71.94 | −9.04 | 0.38 | Yao (1995) |
| 42 | Tianjin Wanjia Wharf (1) | 2398 | 96 | Jixian System | —— | —— | 2.61 | 3.39 | 2.61 | -70.46 | -9.00 | 1.54 | Yao (1995) |
| 43 | Tianjin Dongjiao Farm (1) | 1175 | 52 | Neogene Guantao Formation | -4.02 | 0.5 | 2.38 | 3.73 | 2.38 | -74.60 | -9.06 | -2.12 | Yao (1995) |
| 44 | Tianjin Shanlingzi (1) | 791 | 44 | Neogene Minghuazhen Formation | -4.0 | 4.5 | 1.05 | 1.36 | 1.05 | -80.1 | -8.84 | -9.38 | Yao (1995) |
| 45 | Tianjin Academy of Agricultural Sciences (1) | 1852 | 58 | Neogene Guantao Formation | —— | —— | 2.25 | 2.92 | 2.25 | -76.51 | -9.01 | -4.43 | Yao (1995) |
| 46 | Tianjin Duck Farm (1) | 907 | 49 | Neogene Minghuazhen Formation | —— | —— | 2.93 | 3.81 | 2.93 | -74.11 | -9.47 | 1.65 | Yao (1995) |
| 47 | Dongxiangzhuang, Southeast Yongqing County (1) | 1219 | 53 | Ordovician | —— | —— | 1.25 | 1.62 | 1.25 | -75.80 | -9.87 | 3.16 | Yao (1995) |
| 48 | Longhu Village, Yongqing County (1) | 1274 | 83 | Wumishan Formation of Jixian System | —— | —— | 1.72 | 2.24 | 1.72 | -77.40 | -9.29 | -3.08 | Yao (1995) |
| 49 | Beichenzhuang, Xiong County (1) | 1204 | 70 | Wumishan Formation of Jixian System | —— | —— | 2.22 | 2.88 | 2.22 | -81.90 | -9.08 | -9.26 | Yao (1995) |
| 50 | Lugang Xingang Community, Xiong County (1) | —— | 50 | Wumishan Formation of Jixian System | -4 | ＜0.44 | >4.35 | >3.95 | 2.97 | -74 | -8.82 | -3.44 | ① |
| 51 | Taishan Road, Nanmeng Town, Bazhou City (1) | —— |  | Wumishan Formation of Jixian System | -5.2 | ＜0.44 | >4.35 | >3.96 | 3.19 | -75.57 | -9.13 | -2.53 | ① |
| 52 | Donghuai Village Heat Exchange Station, Xiong County (1) | —— | 62.5 | Wumishan Formation of Jixian System | -3.9 | ＜0.44 | >4.35 | >4.04 | 2.95 | -73.78 | -8.77 | -3.62 | ① |
| 53 | Changzhuang Village, Xiongzhou Town, Xiong County (1) | —— | 73 | Wumishan Formation of Jixian System | -3.4 | ＜0.44 | >4.35 | >4.06 | 2.84 | -73.89 | -8.79 | -3.57 | ① |
| 54 | Xizhan Middle School, Daying Town, Xiong County (1) | —— | 71 | Wumishan Formation of Jixian System | -5.9 | ＜0.44 | 4.15 | >3.94 | 3.29 | -73.85 | -8.85 | -3.05 | ① |
| 55 | Hujiatai, Zhugezhuang Town, Xiong County (1) | —— | 66 | Wumishan Formation of Jixian System | -5.1 | ＜0.44 | >4.35 | >3.97 | 3.17 | -73.76 | -8.71 | -4.08 | ① |
| 56 | Xueguantun Township, Cang County (1) | 1202 | 77 | Wumishan Formation of Jixian System | —— | —— | 1.96 | 2.54 | 1.96 | -69.70 | -8.64 | -0.58 | Yao (1995) |
| 57 | South Mazhuang, Hejian County (1) | 1551 | 83 | Cambrian System, Ordovician | -5.85 | 2.07 | 1.35 | 2.60 | 2.00 | -68.90 | -7.48 | -9.06 | Yao (1995) |
| 58 | North East of Hejian County (1) | 2703 | 99 | Cambrian System, Ordovician | -5.37 | 0.41 | 1.75 | 4.25 | 3.27 | -69.30 | -7.51 | -9.22 | Yao (1995) |
| 59 | South East of Hejian County (1) | 2691 | 75 | Cambrian System, Ordovician | —— | —— | 1.80 | 2.34 | 1.80 | -72.4 | -7.45 | -12.80 | Yao (1995) |
| 60 | 12 km north of Xinji City (1) | 3033 | 80 | Cambrian System - Jixian System | -7.86 | 5.40 | 1.90 | 1.89 | 1.46 | -74.00 | -9.29 | 0.32 | Yao (1995) |
| 61 | 8 km northwest of Xinji City (1) | 2052 | 83 | Jixian System | -7.40 | 3.69 | 2.05 | 2.24 | 1.72 | -75.44 | -9.15 | -2.24 | Yao (1995) |
| 62 | 2 km northeast of Xinji City (1) | —— | —— | Ordovician | -11.83 | 5.63 | 2.09 | 2.29 | 1.76 | -77.60 | -10.33 | 5.04 | Yao (1995) |
| 63 | 12 km southwest of Xinji City (1) | 2470 | 73 | Ordovician | -6.61 | 6.1 | 1.54 | 1.57 | 1.21 | -76.10 | -8.84 | -5.38 | Yao (1995) |
| 64 | 22 km southeast of Xinji City (1) | 1700 | 71 | Neogene Guantao Formation | -7.67 | 6.7 | 1.59 | 1.63 | 1.26 | -74.70 | -8.62 | -5.74 | Yao (1995) |

1. Actual measurement of this research.