Supplementary Table S1 Δ14C of Dendrochronological single year tree-ring samples for AD 721–820 prepared in the Laboratory of Tree Ring Research (LTRR) at the University of Arizona from sequoia (*Sequoiadendron giganteum*) in Sequoia National Park, California

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Year | Califor-nia A  Δ14C [‰] | Error  [‰] | Califor-nia B  Δ14C [‰] | Error  [‰] | Califor-nia C  Δ14C [‰] | Error  [‰] | Califor-nia D  Δ14C [‰] | Error  [‰] | Califor-nia E  Δ14C [‰] | Error  [‰] |
| 721.5 | -3.5 | 1.5 | -6.3 | 1.4 |  |  |  |  |  |  |
| 722.5 | -8.3 | 1.7 | -14.1 | 1.6 | -5.4 | 1.9 | -4.5 | 1.7 |  |  |
| 723.5 | -10.8 | 1.5 | -8.6 | 1.5 |  |  |  |  |  |  |
| 724.5 | -6.2 | 1.5 | -8.7 | 1.5 |  |  |  |  |  |  |
| 725.5 | -9.8 | 1.5 | -9.6 | 1.5 |  |  |  |  |  |  |
| 726.5 | -9.7 | 1.5 | -12.2 | 1.6 |  |  |  |  |  |  |
| 727.5 | -9.2 | 1.6 | -10.7 | 1.8 |  |  |  |  |  |  |
| 728.5 | -10.5 | 1.9 | -12.3 | 1.5 |  |  |  |  |  |  |
| 729.5 | -8.1 | 2 | -9.5 | 1.5 |  |  |  |  |  |  |
| 730.5 | -4.4 | 1.5 | -11.2 | 1.7 |  |  | -8 | 1.9 |  |  |
| 731.5 | -6.7 | 1.5 |  |  |  |  | -8.9 | 1.7 |  |  |
| 732.5 | -8.8 | 1.5 |  |  |  |  | -12.5 | 1.8 |  |  |
| 733.5 | -8 | 1.5 |  |  |  |  |  |  |  |  |
| 734.5 | -10 | 1.5 |  |  |  |  | -10.4 | 1.6 |  |  |
| 735.5 | -9.9 | 1.5 |  |  |  |  | -10.2 | 1.6 |  |  |
| 736.5 | -9 | 1.5 |  |  |  |  |  |  |  |  |
| 737.5 | -9.2 | 1.5 |  |  |  |  | -8.4 | 1.9 |  |  |
| 738.5 | -8 | 1.6 |  |  |  |  | -12.2 | 1.7 |  |  |
| 739.5 | -10.2 | 1.5 |  |  |  |  | -8.6 | 2.6 |  |  |
| 740.5 | -11.6 | 1.6 |  |  |  |  | -13.3 | 1.8 |  |  |
| 741.5 | -13.2 | 2.2 | -13.4 | 1.5 |  |  | -11.1 | 1.6 |  |  |
| 742.5 |  |  | -15.5 | 1.5 |  |  |  |  |  |  |
| 743.5 |  |  | -15 | 1.5 |  |  |  |  |  |  |
| 744.5 |  |  | -14.4 | 1.5 |  |  |  |  |  |  |
| 745.5 | -17.3 | 1.6 | -14.7 | 1.5 |  |  | -14.4 | 1.6 |  |  |
| 746.5 | -16.7 | 1.7 | -18.4 | 1.4 |  |  |  |  |  |  |
| 747.5 | -13.9 | 2.1 | -16.8 | 1.3 |  |  |  |  |  |  |
| 748.5 | -15.3 | 1.9 |  |  | -12.9 | 2.2 |  |  |  |  |
| 749.5 | -15.6 | 1.7 | -17.1 | 1.4 |  |  |  |  |  |  |
| 750.5 | -14.9 | 1.8 | -19 | 1.7 |  |  |  |  |  |  |
| 751.5 | -15.4 | 1.7 | -18 | 1.5 |  |  |  |  |  |  |
| 752.5 | -16.7 | 1.7 | -17.2 | 1.4 |  |  | -13.5 | 1.6 |  |  |
| 753.5 | -16.3 | 2.2 | -14.6 | 1.5 | -19 | 2.1 | -16.5 | 1.6 |  |  |
| 754.5 | -19.1 | 1.8 | -21.6 | 1.4 | -17.2 | 1.9 | -15.4 | 2.1 |  |  |
| 755.5 | -19.2 | 1.7 | -21.6 | 1.4 |  |  | -19 | 1.7 |  |  |
| 756.5 | -19.8 | 2.1 | -18.9 | 1.5 |  |  |  |  |  |  |
| 757.5 | -20.4 | 1.6 | -19.7 | 1.5 |  |  |  |  |  |  |
| 758.5 | -14.1 | 1.7 | -20.8 | 1.4 |  |  | -14.6 | 2 | -18.8 | 1.5 |
| 759.5 | -13.1 | 1.7 | -17.9 | 1.3 |  |  | -12.9 | 1.7 | -18.8 | 1.5 |
| 760.5 | -15.9 | 1.7 | -18.3 | 1.4 |  |  | -15.1 | 1.6 | -16 | 1.5 |
| 761.5 | -15.4 | 1.7 |  |  |  |  | -15 | 1.6 | -15.3 | 1.5 |
| 762.5 | -16.2 | 2.1 |  |  |  |  |  |  | -13.4 | 1.5 |
| 763.5 | -14 | 1.8 |  |  |  |  |  |  | -11.6 | 2.2 |
| 764.5 | -12.5 | 1.7 |  |  |  |  |  |  | -14.9 | 1.5 |
| 765.5 | -14.4 | 1.8 |  |  |  |  |  |  | -16.4 | 1.5 |
| 766.5 | -16 | 2.2 |  |  |  |  |  |  | -16.9 | 1.6 |
| 767.5 | -16.1 | 2.4 |  |  |  |  |  |  | -16.8 | 1.5 |
| 768.5 | -17.6 | 2.2 |  |  |  |  |  |  | -21.5 | 1.5 |
| 769.5 | -15.7 | 2.5 |  |  |  |  |  |  | -15.7 | 1.6 |
| 770.5 | -17.5 | 2.3 |  |  |  |  |  |  | -17.4 | 2 |
| 771.5 | -14.5 | 2.2 |  |  |  |  |  |  | -19.8 | 1.6 |
| 772.5 | -18.3 | 2.2 |  |  |  |  |  |  |  |  |
| 773.5 | -17.7 | 2.2 |  |  |  |  |  |  |  |  |
| 774.5 | -16.2 | 2.2 |  |  |  |  |  |  |  |  |
| 775.5 | -3.3 | 2.2 |  |  |  |  |  |  |  |  |
| 776.5 | -3 | 2.2 |  |  |  |  |  |  |  |  |
| 777.5 | -1.7 | 2.4 |  |  |  |  |  |  |  |  |
| 778.5 | -0.5 | 2.2 |  |  |  |  |  |  |  |  |
| 779.5 | -4.6 | 2.2 |  |  |  |  |  |  |  |  |
| 780.5 | -0.7 | 2.2 |  |  |  |  |  |  |  |  |
| 781.5 | -5.7 | 2.2 |  |  |  |  |  |  |  |  |
| 782.5 | -5.3 | 2.6 |  |  |  |  |  |  |  |  |
| 783.5 | -6.5 | 2.3 |  |  |  |  |  |  |  |  |
| 784.5 | -6.8 | 2.3 |  |  |  |  |  |  |  |  |
| 785.5 | -5.7 | 2.2 |  |  |  |  |  |  |  |  |
| 786.5 | -5.3 | 2.2 |  |  |  |  |  |  |  |  |
| 787.5 | -8.1 | 2.2 |  |  |  |  |  |  |  |  |
| 788.5 | -7.3 | 2.2 |  |  |  |  |  |  |  |  |
| 789.5 | -8.7 | 2.3 |  |  |  |  |  |  |  |  |
| 790.5 | -11 | 2.2 |  |  |  |  |  |  |  |  |
| 791.5 | -15.1 | 2.7 | -13.8 | 1.5 |  |  |  |  |  |  |
| 792.5 | -11.3 | 2.8 |  |  |  |  |  |  |  |  |
| 793.5 |  |  | -12.2 | 1.5 |  |  |  |  | -14 | 1.5 |
| 794.5 |  |  | -12.4 | 1.5 |  |  |  |  |  |  |
| 795.5 |  |  | -15.4 | 1.5 |  |  |  |  |  |  |
| 796.5 |  |  | -15.3 | 1.4 |  |  |  |  | -13.4 | 1.9 |
| 797.5 |  |  | -11.6 | 1.5 |  |  |  |  |  |  |
| 798.5 |  |  | -13.7 | 1.4 |  |  |  |  |  |  |
| 799.5 |  |  | -13.8 | 1.5 |  |  |  |  | -13.6 | 1.5 |
| 800.5 |  |  | -12.6 | 1.5 |  |  |  |  |  |  |
| 801.5 |  |  |  |  | -13.5 | 1.9 |  |  |  |  |
| 802.5 |  |  |  |  | -13.5 | 1.9 |  |  |  |  |
| 803.5 |  |  |  |  | -16.6 | 1.9 |  |  |  |  |
| 804.5 |  |  |  |  |  |  |  |  |  |  |
| 805.5 |  |  |  |  |  |  |  |  |  |  |
| 806.5 |  |  |  |  | -14.3 | 1.9 |  |  |  |  |
| 807.5 |  |  |  |  | -13.7 | 2.2 |  |  |  |  |
| 808.5 |  |  |  |  | -10.8 | 2 |  |  |  |  |
| 809.5 |  |  |  |  |  |  |  |  |  |  |
| 810.5 |  |  |  |  |  |  |  |  |  |  |
| 811.5 |  |  |  |  | -12.2 | 1.9 |  |  |  |  |
| 812.5 |  |  |  |  | -14.8 | 1.9 |  |  |  |  |
| 813.5 |  |  |  |  |  |  |  |  |  |  |
| 814.5 |  |  |  |  | -21.1 | 2.1 |  |  | -17.3 | 1.5 |
| 815.5 |  |  |  |  | -13.9 | 2.1 |  |  |  |  |
| 816.5 |  |  |  |  | -12.5 | 1.9 |  |  |  |  |
| 817.5 |  |  |  |  | -15.3 | 1.9 |  |  |  |  |
| 818.5 |  |  |  |  | -16.2 | 2 |  |  |  |  |
| 819.5 |  |  |  |  | -14.1 | 2 |  |  |  |  |
| 820.5 |  |  |  |  | -18 | 1.9 |  |  |  |  |

|  |  |  |
| --- | --- | --- |
| Year | Δ14C [‰] (German oak, present work, single year) | Error [‰] |
| 650.5 | 6.6 | 1.4 |
| 651.5 | 6.9 | 1.9 |
| 652.5 | 7.7 | 1.4 |
| 653.5 | 11.6 | 1.9 |
| 654.5 | 11.7 | 1.5 |
| 655.5 | 9.2 | 1.4 |
| 656.5 | 11 | 1.9 |
| 657.5 | 11.4 | 1.9 |
| 658.5 | 13 | 1.4 |
| 659.5 | 16.1 | 1.6 |
| 660.5 | 11.2 | 1.4 |
| 661.5 | 12.1 | 2.2 |
| 662.5 | 8.5 | 1.6 |
| 663.5 | 7.5 | 1.9 |
| 664.5 | 6.2 | 1.5 |
| 665.5 | 2.8 | 1.4 |
| 666.5 | 4.7 | 1.9 |
| 667.5 | 4.4 | 1.9 |
| 668.5 | 6.5 | 1.5 |
| 669.5 | 8 | 1.6 |

Supplementary Table S2 Δ14C of Dendrochronological single year tree-ring samples for 650–669 BC prepared in the Institute of Botany, University of Hohenheim, Stuttgart, Germany from German oak in Oberhaid, Bavaria, Germany.