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| **Supplementary Table 1**Stable C isotopes of pedogenic carbonate nodules used to estimate below ground % C4 biomass (Nordt et al., 1998) of surface soils (Unit 3d), buried colluvial sediments (Unit 3c), and the buried Smithson paleosol (Unit 2b). Estimated mean July temperature calculated using a modern transfer function from the forest-grassland transition in the Great Plains (Nordt et al., 2007). The difference in actual and calculated mean July temperature in the modern is probably due to C3 brush and forb encroachment, thus the highest 13Coc value from the modern soil (-14.6) was used to determine the differences in modern (actual) and calculated July temperature. |
| Alluvial Unit | Description  | Horizon | Depth(cm) | Origin | 13Ccc (PDB) | 13Coc(PDB) | % C4 Biomass | Mean July T Actual(° C) | Calculated(° C) |
| Unit 3d | P1 | Bk1 | 46 | Modern | -1.7 | -15.6 | 74 |  |  |
|  | P1 | Bk2 | 110 | Modern | -1.7 | -15.6 | 74 |  |  |
| Unit 3d | TT-2 | Bk1 | 88 | Modern | -2.9 | -16.8 | 66 |  |  |
|  | TT-2 | Bk2 | 139 | Modern | -2.7 | -16.6 | 67 |  |  |
| Unit 3d | TT-6 | Bk | 43 | Modern | -0.7 | -14.6 | 82 | 29.7 | 27.5 |
|  | TT-6 | Bk | 82 | Modern | -2.2 | -16.1 | 71 |  |  |
|  |  |  |  |  |  |  | Mean – 72 |  |  |
|  |  |  |  |  |  |  | STD – 6 |  |  |
| Unit 3c | P2 | BC | 195 | Colluvial | -3.9 | -17.8 | 60 |  |  |
|  | P3 | B/C1 | 120 | Colluvial | -5.5 | -19.4 | 48 |  |  |
|  | P3 | B/C2 | 155 | Colluvial | -7.5 | -21.3 | 33 |  |  |
|  | P3 | B/C | 195 | Colluvial | -5.4 | -19.2 | 48 |  |  |
|  | TT-2 | Bk1 | 295 | Colluvial | -5.5 | -19.8 | 48 |  |  |
|  |  |  |  |  |  |  | Mean – 47 |  |  |
|  |  |  |  |  |  |  | STD – 11 |  |  |
| Unit 2b | P1 | Bk1b | 122 | Buried | -9.2 | -23.0 | 21 |  | 23.7 |
|  | P1 | Bk2b | 183 | Buried | -7.4 | -21.2 | 34 |  | 23.3 |
|  | P3 | Bkb | 235 | Buried | -8.8 | -22.6 | 24 |  | 22.4 |
|  |  |  |  |  |  |  | Mean – 26STD – 7 |  |  |