**Supplemental data 1 Matrix indicating the stratigraphic relations and radiocarbon samples**

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**Supplemental data 2 Radiocarbon dates from San Andrés**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Lab code | Context description | Material | δ13C(‰) | ConventionalAge (14C yr BP) | Unmodeled Calibrated Age (95% confidence) | Modeled Calibrated Age (95% confidence) |
| **San Andrés (this study)** | 　 | 　 | 　 | 　 | 　 |
| TKA-17786 | Tr.1, layer XIX (under the TBJ deposit) | Charcoal | -25.4  | 2242 ± 16 | 385-210 BC | 385-210 BC |
| TKA-17787 | Tr.2, Bell-spahed Pit 1 | Charcoal | -25.0  | 1388 ± 15 | AD 610-665  | AD 615-665 |
| TKA-17788 | Str.5, Tr.3, layer VI (under the EB deposit) | Charcoal | -28.1  | 885 ± 20 | AD 1050-1220 | AD 1040-1215 |
| TKA-17789 | Str.5, Tr.3, layer VI (under the EB deposit) | Charcoal | -22.7  | 127 ± 19 | AD 1680-1940 | Outlier |
| TKA-17790 | Str.5, Tr.3, Adobe phase (construction fill) | Charcoal | -26.0  | 1477 ± 15 | AD 565-640 | AD 615-655 |
| TKA-17791 | Str.5, Tr.3, Adobe phase (into adobe) | Charcoal | -21.6  | 1332 ± 15 | AD 655-775 | AD 630-685 |
| TKA-17792 | Str.5, Tr.3, TBJ-Stone-faced phase (on floor) | Charcoal | -22.5  | 1509 ± 15 | AD 550-600 | AD 560-600 |
| TKA-17793 | Str.5, Tr.3, Adobe phase (construction fill) | Charcoal | -26.8  | 1135 ± 15 | AD 880-980 | Outlier |
| TKA-17794 | Str.5, Tr.3, Adobe phase (construction fill) | Charcoal | -24.5  | 2140 ± 15 | 345-60 BC | Outlier |
| TKA-17795 | Str.5, Tr.3, TBJ-Stone-faced phase (on floor) | Charcoal | -25.3  | 2114 ± 22 | 200-50 BC | Outlier |
| TKA-17796 | Str.5, Tr.3, TBJ-Stone-faced phase (on floor) | Charcoal | -26.0  | 1480 ± 15 | AD 560-640 | AD 565-615 |
| TKA-17797 | Str.5, Tr.3, TBJ-Stone-faced phase (on floor) | Charcoal | -22.9  | 2110 ± 22 | 195-55 BC | Outlier |
| TKA-17798 | Str.5, Tr.3, layer XIX (under the TBJ) | Charcoal | -22.1  | 1613 ± 15 | AD 415-540 | AD 415-540 |
| TKA-17799 | Str.5, Tr.3, TBJ-Stone-faced structure (on floor) | Charcoal | -26.9  | 1506 ± 15 | AD 550-600 | AD 560-600 |
| TKA-17800 | Str.5, Tr.4, layer IV, Adobe phase (construction fill) | Charcoal | -23.3  | 1413 ± 18 | AD 605-655 | AD 620-660 |
| TKA-19374 | Str.5, Tr.6, TBJ-Earth phase, layer IX | Charcoal | -24.4  | 1554 ± 19 | AD 435-570 | AD 535-570 |
| TKA-19375 | Str.5, Tr.6, TBJ-Earth phase, layer XIX | Charcoal | -21.9  | 1545 ± 19 | AD 435-585 | AD 535-570 |
| TKA-19376 | Str.5, Tr.6, TBJ-Earth phase, layer X  | Charcoal | -26.2  | 1474 ± 20 | AD 565-640 | Outlier |
| TKA-19377 | Str.6, Tr.8, TBJ-Earth phase, layer VI | Charcoal | -27.3  | 87 ± 18 | AD 1695-1930 | Outlier |
| TKA-19378 | Str.6, Tr.8, Burned room (construction fill) | Charcoal | -21.4  | 1429 ± 19 | AD 600-652 | AD 610-655 |
| TKA-19379 | Str.6, Tr.8, Burned room (construction fill) | Charcoal | -23.1  | 1369 ± 20 | AD 640-675 | AD 610-670 |
| TKA-19380 | Str.10, Tr.9, layer Vb (on floor) | Charcoal | -22.5  | 1285 ± 19 | AD 670-775 | AD 670-775 |
| TKA-19381 | Str.9, Tr.10, layer VI (above the LC deposit) | Charcoal | -28.3  | 1617 ± 20 | AD 415-540 | Outlier |
| TKA-21283 | Str.6, Tr.8 Ext., construction fill | Charcoal | -24.2  | 1431 ± 19 | AD 600-650 | AD 610-645 |
| TKA-21284 | Str.6, Tr.8 Ext.sub., layer IV (construction fill) | Charcoal | -25.5  | 1488 ± 20 | AD 550-640 | Outlier |
| TKA-21285 | Str.6, Tr.8 Ext.sub., layer VI (under the LC deposit) | Charcoal | -23.4  | 1426 ± 20 | AD 600-655 | AD 595-635 |
| TKA-21286 | Str.5, Tr.11 TBJ redeposit | Charcoal | -29.8  | 1510 ± 20 | AD 540-605 | AD 540-570 |
| **San Andrés (McKee 2007: 285, 296)** | 　 | 　 | 　 | 　 | 　 |
| A-12580 | Op. 99-2 F.9, Burned midden beneath Talpetate Inferior | Charcoal | -24.3 | 1525 ± 55 | AD 425-640 | AD 475-635 |
| A-12581 | Op. 99-2 F.9, Burned midden beneath Talpetate Inferior | Charcoal | -24.9 | 1500 ± 50 | AD 435-650 | AD 480-635 |
| A-12582 | Op. 99-2 F.4, Burned midden beneath EB deposit | Charcoal | -25.4 | 1130 ± 45 | AD 775-1020 | AD 830-1020 |
| A-12583 | Op. 99-2 F.4, Burned midden beneath EB deposit | Charcoal | -25.2 | 1110 ± 45 | AD 775-1025 | AD 835-1025 |

**References**

McKee, Brian R.

 2007 Volcanism, Household Archeology, and Formation Processes in the Zapotitán Valley, El Salvador*.* Ph.D. dissertation, Department of Anthropology, University of Arizona, Tucson.

**Supplemental data 3 Radiocarbon dates from sites in the Zapotitán Valley**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Lab code | Context description | Material | δ13C(‰) | Conventional Age (14C yr BP) | Unmodeled Calibrated Age (95% confidence) | Modeled Calibrated Age (95% confidence) |
| **Cerén (Sheets 1983:7; McKee 2002:7; Slotten 2015:72)** | 　 | 　 | 　 | 　 | 　 |
| TX3113A | Structure-1 | Grass thatch | - | 1330 ± 90 | AD 560-940 | AD 585-635 |
| TX6601 | Structure-2 | Grass thatch | - | 1350 ± 90 | AD 540-890 | AD 585-635 |
| A-10743 | Structure-1 | Grass thatch | - | 1360 ± 50 | AD 600-775 | AD 595-635 |
| TX3119A | Structure-1 | Wooden Post | - | 1420 ± 50 | AD 550-750 | AD 585-635 |
| ELS-40 | Structure-1 | Grass thatch | - | 1440 ± 135 | AD 260-890 | Outlier |
| TX6600 | Structure-3 | Grass thatch | - | 1520 ± 70 | AD 420-650 | AD 560-640 |
| TX3120 | Structure-1 | Wooden Post | - | 1510 ± 390 | 390 BC-AD 1255 | Outlier |
| AA105791 | - | Achene | - | 1419 ± 25 | AD 600-660 | AD 595-635 |
| **El Cambio (Sheets 1983: 7)** | 　 | 　 | 　 | 　 | 　 |
| Tx3121 | F.8 of T.P.19 | Charcol | - | 1320 ± 100 | AD 265-675 | AD 605-760 |
| Tx3123 | F.5 of T.P.16 | Charcol | - | 1510 ± 90 | AD 555-975 | AD 605-865 |
| **Nuevo Lourdes Ponientes (Ichikawa et al. 2014:170)** | 　 | 　 | 　 | 　 | 　 |
| PLD-26296 | Burial-1 | Human bone | -7.1 | 1249 ± 18 | AD 655-775 | AD 655-775 |
| PLD-26297 | Burial-2 | Human bone | -9.1 | 1242 ± 17 | AD 680-870 | AD 680-820 |
| PLD-26298 | Burial-3 | Human bone | -18 | 1328 ± 22 | AD 680-875 | AD 680-825 |
| **Contexts related to the El Boquerón eruption (Ferres et al. 2011:842)**　 |
| DF-C11 | Under San Andres Tuff (Talpetate I) | Tree trunk | -28.2  |  770 ± 55 | AD 1160-1385 | Outlier |
| DF-C12 | Under San Andres Tuff (Talpetate I) | Tree trunk | -26.7  | 1002 ± 35 | AD 990-1155 | AD 990-1155 |
| DF-C1M | Under San Andres Tuff (Talpetate I) | Tree trunk | -26.6  |  945 ± 35 | AD 1025-1175 | AD 1030-1170 |
| DF-C2 | Overlying San Andres Tuff (Talpetate I) | Charcol | -26.6  |  766 ± 34 | AD 1220-1285 | AD 1215-1290 |

**References**

Ferrés, Dolores, Hugo Delgado Granados, Walter Hernández, Carlos Pullinger, Hugo Chávez, Rafael Castillo Taracena, and Carlos Cañas Dinarte

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Ichikawa, Akira, Roberto Gallardo, Hugo Díaz, and Julio Alvarado

 2014 Nuevo datos de radiocarbono relacionados con la erupción del Volcán Ilopango. *Anales del Museo Nacional de Antropología “Dr. David J. Guzmán” El Salvador* 53:160–175.

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Sheets, Payson D. (editor)

 1983 *Archaeology and Volcanism in Central America: The Zapotitán Valley of El Salvador.* University of Texas, Austin.

Slotten, Venicia

 2015 Paleoethnobotanical Remains and Land Use Associated with the Sacbe at the Ancient Maya Village of Joya de Cerén. Master’s Thesis, Department of Anthropology, University of Cincinnati, Ohio.

**Supplemental data 4 Oxcal code (Oxcal v.4.4.2)**

Plot()

 {

 Outlier\_Model("General",T(5),U(0,4),"t");

 Phase("under\_TBJ")

 {

 R\_Date("TKA-17786", 2242, 16)

 {

 Outlier(0.05);

 };

 R\_Date("TKA-17798", 1613, 15)

 {

 Outlier(0.05);

 };

 };

 Sequence("Campana\_Structure")

 {

 Boundary("Start\_Campana");

 Date("TBJ", U(420, 540));

 Sequence("TBJ-Earth\_phase")

 {

 Boundary("Start\_TBJ-Earth\_phase");

 Phase("TBJ-Earth\_phase")

 {

 R\_Date("TKA-19375", 1545, 19)

 {

 Outlier(0.05);

 };

 R\_Date("TKA-21286", 1510, 20)

 {

 Outlier(0.05);

 };

 R\_Date("TKA-19376", 1474, 20)

 {

 Outlier();

 };

 R\_Date("TKA-19374", 1554, 19)

 {

 Outlier(0.05);

 };

 };

 Boundary("End\_TBJ-Earth\_phase");

 };

 Boundary("Transition\_TBJ-Earth/TBJ-Stone-faced\_phase");

 Phase("TBJ-Stone-faced\_phase")

 {

 R\_Date("TKA-17795", 2114, 22)

 {

 Outlier();

 };

 R\_Date("TKA-17797", 2110, 22)

 {

 Outlier();

 };

 R\_Date("TKA-17792", 1509, 15)

 {

 Outlier(0.05);

 };

 R\_Date("TKA-17799", 1506, 15)

 {

 Outlier(0.05);

 };

 R\_Date("TKA-17796", 1480, 15)

 {

 Outlier(0.05);

 };

 };

 Boundary("LC");

 Sequence("Adobe\_phase")

 {

 Boundary("Start\_Adobe\_phase");

 Phase("Adobe\_phase")

 {

 R\_Date("TKA-17791", 1332, 15)

 {

 Outlier(0.05);

 };

 R\_Date("TKA-17794", 2140, 15)

 {

 Outlier();

 };

 R\_Date("TKA-17790", 1477, 15)

 {

 Outlier(0.05);

 };

 R\_Date("TKA-17800", 1413, 18)

 {

 Outlier(0.05);

 };

 R\_Date("TKA-17793", 1135, 15)

 {

 Outlier();

 };

 };

 Boundary("End\_Adobe\_phase");

 };

 Boundary("End\_Campana");

 Boundary("Start\_Possible\_Decline\_Period");

 Phase("Possible\_Decline\_Period")

 {

 R\_Date("TKA-17788", 885, 20)

 {

 Outlier(0.05);

 };

 };

 Boundary("End\_Possible\_Decline\_Period");

 Date("EB");

 Boundary("End\_Campana\_Structure");

 };

 Line();

 Sequence("Structure\_6")

 {

 Boundary("Start\_Structure\_6");

 R\_Date("TKA-21285", 1426, 20)

 {

 Outlier(0.05);

 };

 Boundary("=LC");

 Phase("Fill\_Structure\_6")

 {

 R\_Date("TKA-21284", 1488, 20)

 {

 Outlier();

 };

 R\_Date("TKA-21283", 1431, 19)

 {

 Outlier(0.05);

 };

 };

 Phase("Burned\_room\_Fill")

 {

 R\_Date("TKA-19378", 1429, 19)

 {

 Outlier(0.05);

 };

 R\_Date("TKA-19379", 1369, 20)

 {

 Outlier(0.05);

 };

 };

 Boundary("End\_Structure\_6");

 };

 Line();

 Sequence("Structure\_9")

 {

 Boundary("=LC");

 R\_Date("TKA-19381", 1617, 20)

 {

 Outlier();

 };

 };

 Line();

 Sequence("Structure\_10")

 {

 Boundary("=LC");

 R\_Date("TKA-19380", 1285, 19)

 {

 Outlier(0.05);

 };

 };

 Line();

 Sequence("Bell\_Shaped\_Pit\_1")

 {

 Boundary("=LC");

 R\_Date("TKA-17787", 1388, 15)

 {

 Outlier(0.05);

 };

 };

 Line();

 Sequence("MacKee\_2007\_San\_Andres")

 {

 Boundary("Start\_MacKee\_2007");

 Phase("Under\_Talpetate\_Inferior")

 {

 R\_Date("A-12580", 1525, 55)

 {

 Outlier(0.05);

 };

 R\_Date("A-12581", 1500, 50)

 {

 Outlier(0.05);

 };

 };

 Boundary("=LC");

 Boundary("=Start\_LC\_to\_EB");

 Phase("Under\_EB deposit")

 {

 R\_Date("A-12582", 1130, 45)

 {

 Outlier(0.05);

 };

 R\_Date("A-12583", 1110, 45)

 {

 Outlier(0.05);

 };

 };

 Date("=EB");

 Boundary("End\_MacKee\_2007");

 };

 Line();

 Sequence("El\_Cambio")

 {

 Boundary("=LC");

 Phase("El\_Cambio")

 {

 R\_Date("Tx3123", 1510, 90)

 {

 Outlier(0.05);

 };

 R\_Date("Tx3121", 1320, 100)

 {

 Outlier(0.05);

 };

 };

 Boundary("End\_El\_Cambio");

 };

 Line();

 Sequence("Nuevo\_Lourdes\_Ponientes")

 {

 Boundary("Start\_Nuevo\_Lourdes\_Ponientes");

 Phase("Burials")

 {

 R\_Date("PLD-26298", 1328, 22)

 {

 Outlier(0.05);

 };

 R\_Date("PLD-26296", 1249, 18)

 {

 Outlier(0.05);

 };

 R\_Date("PLD-26297", 1242, 17)

 {

 Outlier(0.05);

 };

 };

 Boundary("End\_Nuevo\_Lourdes\_Ponientes");

 };

 Line();

 Sequence("Ferres\_et\_al\_2011")

 {

 Boundary("Start\_Ferres\_et\_al\_2011");

 R\_Date("DF\_C11", 770, 55)

 {

 Outlier();

 };

 R\_Date("DF\_C12", 1002, 35)

 {

 Outlier(0.05);

 };

 R\_Date("DF\_C1M", 945, 35)

 {

 Outlier(0.05);

 };

 Date("=EB");

 R\_Date("DF-C2", 766, 34)

 {

 Outlier(0.05);

 };

 Boundary("End\_Ferres\_et\_al\_2011");

 };

 Line();

 Sequence("LC\_eruption")

 {

 Tau\_Boundary("Start\_LC\_eruption");

 Phase("Ceren")

 {

 R\_Date("TX6600", 1520, 70)

 {

 Outlier(0.05);

 };

 R\_Date("ELS-40", 1440, 135)

 {

 Outlier();

 };

 R\_Date("TX3119A", 1420, 50)

 {

 Outlier(0.05);

 };

 R\_Date("AA105791", 1419, 25)

 {

 Outlier(0.05);

 };

 R\_Date("A-10743", 1360, 50)

 {

 Outlier(0.05);

 };

 R\_Date("TX6601", 1350, 90)

 {

 Outlier(0.05);

 };

 R\_Date("TX3113A", 1330, 90)

 {

 Outlier(0.05);

 };

 };

 Boundary("=LC");

 };

 };