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# Stratigraphy and sedimentology of the Orakei maar lake sediment sequence (Auckland Volcanic Field, New Zealand)

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**Table S1: Summary of 16 lithostratigraphic units and 31 subunits in the Orakei maar sediment sequence.**

| Facies unit number | Abbreviated description | Base (m; composite depth) | Base (m; event-corrected depth) | Basal contact |
|---|---|---|---|---|
| 0 | Marine/Estuarine Mud | 0 | 0 | sharp |
| 1a | Peat | 0.3 | 0.3 | gradual |
| 1b | Beige (10YR 3/1 to 10YR 4/1) massive clay | 0.58 | 0.58 | sharp |
| 1c | Peat | 1.38 | 1.38 | gradual |
| 2a | Beige (10YR 3/1 to 10YR 4/1) massive clay | 1.74 | 1.74 | sharp |
| 2b | Sand | 1.96 | 1.96 | sharp |
| 2c | Light brown (10YR 3/2) massive clay with bioturbation | 9.32 | 9.30 | sharp |
| 3a | Finely banded sand (10YR 4/4) / silt (10YR 5/3) | 10.08 | 10.06 | gradual |
| 3b | Banded sand, disturbed, lots of organic remains | 13.80 | 13.78 | gradual |
| 3c | Fine light beige (10YR 4/4) sand bands in brown sand/silt (10YR 5/3), some larger organic remains | 16.93 | 16.91 | sharp |
| 4 | Light brown (10YR 4/3 to 10YR 5/3) clay, fine laminations (small colour change between laminations), some drilling disturbance | 26.60 | 26.545 | gradual |
| 5 | Brown, greyish (10YR 6/2 to 10YR 6/4) very fine clay with light wavy laminations | 27.92 | 27.865 | sharp |
| 6 | Massive light brown clay (2.5Y 4/2) with basaltic tephra and disturbance | 29.24 | 29.125 | sharp |
| 7 | Reddish brown (10YR 3/4) clay with fine laminations and very abundant basaltic tephra | 31.40 | 30.84 | sharp |
| 8a | Dark brown (10YR 2/2 to 10YR 3/2) fine laminations (small colour contrast between laminations) | 45.125 | 44.393 | sharp |
| 8b | Dark brown (10YR 2/2 to 10YR 3/2) fine laminations (stronger colour contrast between laminations) | 50.94 | 49.798 | sharp |
| 9a | Structureless dark silt (disturbed) | 51.17 | 50.028 | sharp |
| 9b | Banded sand/silt (10YR 3/3) | 55.71 | 54.143 | sharp |
| 9c | Dominantly sand | 56.45 | 54.443 | sharp |
| 10 | Fine brown (10YR 2/2) laminations, stronger colour contrast between laminations (darker), frequent (thin) turbidites | 65.69 | 63.363 | sharp |

| | | | | |
|---|---|---|---|---|
| 11a | Silt with thin sand layers | 67.86 | 65.533 | sharp |
| 11b | Abundant sand layers/bands in silty matrix | 68.30 | 65.973 | sharp |
| 11c | Coarse sand with big wood pieces | 70.825 | 67.348 | sharp |
| 11d | Thick sand bands in silty matrix, some wood | 73.485 | 69.618 | gradual |
| 12a | Finely laminated clay with abundant silt and sand layers, some larger organics | 75.36 | 71.423 | sharp |
| 12b | Finely laminated brown (10YR 2/2) clay with some turbidites and disturbance | 76.71 | 72.773 | sharp |
| 13a | Very dark brown (10YR 3/4 to 10YR 2/2) clay with abundant turbidites, fine laminations | 77.86 | 73.763 | sharp |
| 13b | Finely laminated very dark brown (10YR 3/4 to 10YR 2/2) clay, laminations in very high frequency and strong colour contrast, very abundant (sometimes thick) turbidites | 82.57 | 77.823 | sharp |
| 14a | Massive light brown (10YR 5/3 to 10YR 5/4) clay and layered basaltic ash | 82.89 | 78.078 | sharp |
| 14b | Massive light brown (10YR 5/3 to 10YR 5/4) clay (very fine) | 84.075 | 79.243 | gradual |
| 15 | Basaltic ash with some wood debris | 86.34 | [a] | sharp |
| 16 | Country rock, sandstone | 88.44 | [a] | base of core |

[a] Facies units 15 and 16 are entirely removed on the event corrected depth being the ejecta from the formative eruption (15) and underlying sandstone (16).

**Table S2: Overview of identified rhyolitic tephra layers in the Orakei sediment sequence identified in Peti et al. (under review) and AVF1 with published ages.**

| **Tephra name** | **ECD (m) in Orakei sequence** | **Age (ka cal BP)** | **1 standard deviation (ka)** | **Reference** |
|---|---|---|---|---|
| Rotorua | 5.23 | 15.635 | 0.412 | (Lowe et al., 2013) |
| Okareka | 20.74 | 21.858 | 0.290 | (Lowe et al., 2013) |
| Maketu | 40.37 | 35.928 | 0.585 | re-calibrated with SHCal13 (Hogg et al., 2013) after (Molloy et al., 2009) |
| Tahuna | 41.988 | 37.855 | 0.805 | re-calibrated with SHCal13 (Hogg et al., 2013) after (Molloy et al., 2009) |
| Rotoehu | 45.138 | 45.1 | 1.650 | (Danišík et al., 2012) |
| AVF1 | 60.043 | 83.1 | ca. 1-2 | (Molloy et al., 2009) |
| AVF1 | 60.043 | 106.17 | 4.3 | (Hopkins et al., 2017) |

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