Suplementary material 1. Environmental characteristics of the study areas. Different letters indicate significative differences (*p*<0.05).

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | **Atalaia** | | | | | | | **Farol-Velho** | | | | | | | **Corvinas** | | | | | | |
| **A** | **B** | **C** | **D** | **E** | **F** | **G** | **A** | **B** | **C** | **D** | **E** | **F** | **G** | **A** | **B** | **C** | **D** | **E** | **F** | **G** |
| **Organic Matter %** | **B** | 0.009±0.010 | 0.024±0.011 | 0.039±0.015 | 0.030±0.005 | 0.053±0.043 | 0.132±0.07 | 0.118±0.05 | 0.037±0.011 | 0.042±0.007 | 0.050±0.003 | 0.052±0.003 | 0.085±0.001 | 0.259±0.241 | 0.260±0.218 | 0.033±0.005 | 0.039±0.001 | 0.052±0.009 | 0.053±0.005 | 0.062±0.016 | 0.081±0.019 | 0.189±0.125 |
| **V** | 0.01±0.01 | 0.009±0.004 | 0.043±0.007 | 0.0313±0.003 | 0.016±0.001 | 0.040±0.016 | 0.051±0.029 | 0.003±0.001 | 0.016±0.007 | 0.033±0.002 | 0.036±0.004 | 0.040±0.008 | 0.052±0.006 | 0.279±0.052 | 0.025±0.016 | 0.029±0.004 | 0.040±0.001 | 0.044±0.001 | 0.049±0.007 | 0.053±0.003 | 0.073±0.016 |
| **A1** | 0.041±0.005 | 0.029±0.003 | 0.040±0.010 | 0.054±0.001 | 0.066±0.009 | 0.076±0.007 | 0.071±0.012 | 0.045±0.001 | 0.046±0.004 | 0.052±0.006 | 0.053±0.016 | 0.068±0.002 | 0.062±0.001 | 0.136±0.064 | 0.026±0.003 | 0.046±0.007 | 0.046±0.003 | 0.069±0.01 | 0.062±0.012 | 0.076±0.021 | 0.119±0.035 |
| **A2** | 0.024±0.006 | 0.031±0.005 | 0.046±0.001 | 0.036±0.003 | 0.035±0.005 | 0.049±0.017 | 0.067±0.032 | 0.019±0.001 | 0.042±0.018 | 0.040±0.011 | 0.055±0.010 | 0.067±0.002 | 0.072±0.011 | 0.060±0.008 | 0.042±0.004 | 0.049±0.014 | 0.043±0.018 | 0.062±0.004 | 0.056±0.007 | 0.084±0.004 | 0.092±0.008 |
| **Grain Size** | **B** | 2.25 | 2.42 | 2.54 | 1.26 | 1.45 | 2.95 | 1.48 | 2.63 | 2.72 | 2.9 | 2.79 | 2.87 | 2.77 | 3.88 | 2.75 | 1.35 | 2.54 | 2.97 | 2.95 | 1.47 | 1.3 |
| **V** | 2.22 | 1.98 | 2.17 | 1.03 | 2.01 | 2.53 | 2.58 | 1.29 | 2.58 | 2.79 | 2.71 | 3.05 | 3.28 | 3.09 | 2.69 | 2.68 | 2.79 | 2.54 | 2.52 | 2.53 | 1.3 |
| **A1** | 2.15 | 2.29 | 2.28 | 2.22 | 2.38 | 2.44 | 1.25 | 3.15 | 3.15 | 3.02 | 3.02 | 3 | 1.5 | 3.09 | 2.6 | 2.46 | 2.77 | 2.47 | 3.05 | 1.22 | 1.25 |
| **A2** | 2.26 | 2.26 | 2.25 | 2.22 | 2.52 | 2.25 | 1.12 | 2.42 | 2.71 | 2.91 | 2.73 | 1.27 | 1.28 | 2.59 | 2.76 | 2.75 | 2.77 | 2.77 | 2.77 | 2.76 | 2.77 |
| **Medium Sand %** | **B** | 6.92 | 11.27 | 4.43 | 0.01 | 2.85 | 0.00 | 5.24 | 1.71 | 1.07 | 1.09 | 1.93 | 1.66 | 0.24 | 0.0 0 | 3.90 | 0.83 | 4.43 | 0.00 | 2.82 | 0.00 | 5.09 |
| **V** | 13.15 | 11.64 | 7.53 | 32.58 | 46.98 | 12.89 | 7.88 | 7.72 | 7.92 | 8.27 | 15.09 | 3.14 | 0.00 | 0.00 | 11.16 | 4.41 | 0.00 | 6.10 | 0.00 | 12.86 | 5.09 |
| **A1** | 9.39 | 3.20 | 2.30 | 9.92 | 2.03 | 10.44 | 3.16 | 4.71 | 0.78 | 0.00 | 0.07 | 0.00 | 0.00 | 0.00 | 1.13 | 1.55 | 0.00 | 0.00 | 0.00 | 1.33 | 2.46 |
| **A2** | 1.70 | 0.52 | 0.39 | 1.24 | 6.46 | 1.17 | 2.87 | 3.04 | 1.77 | 1.47 | 1.25 | 2.45 | 1.88 | 2.76 | 2.13 | 0.36 | 0.25 | 1.23 | 2.37 | 1.15 | 2.85 |
| **Fine Sand %** | **B** | 93.08 | 88.73 | 95.10 | 99.99 | 62.82 | 59.70 | 84.18 | 89.61 | 87.81 | 83.84 | 72.46 | 71.77 | 62.86 | 40.72 | 89.11 | 93.45 | 95.10 | 61.32 | 62.15 | 59.04 | 81.83 |
| **V** | 86.85 | 86.00 | 92.47 | 64.01 | 53.02 | 76.87 | 81.83 | 92.28 | 87.72 | 35.53 | 82.57 | 23.29 | 39.26 | 60.83 | 86.34 | 93.23 | 72.53 | 91.37 | 97.10 | 76.90 | 81.83 |
| **A1** | 90.61 | 95.58 | 79.70 | 0.08 | 99.69 | 88.53 | 94.54 | 12.22 | 17.71 | 19.61 | 44.10 | 48.76 | 48.75 | 33.51 | 85.87 | 90.54 | 72.53 | 100.00 | 0.00 | 88.67 | 94.17 |
| **A2** | 93.58 | 99.48 | 99.61 | 98.76 | 93.54 | 88.75 | 96.27 | 94.16 | 93.62 | 91.88 | 21.40 | 93.05 | 87.44 | 93.25 | 95.13 | 98.54 | 98.07 | 97.97 | 96.95 | 96.89 | 95.51 |
| **Very Fine Sand %** | **B** | 0.00 | 0.00 | 0.47 | 0.00 | 34.33 | 40.30 | 10.59 | 8.55 | 11.04 | 14.97 | 25.00 | 25.36 | 36.73 | 25.91 | 6.99 | 5.72 | 0.47 | 38.68 | 33.97 | 39.85 | 10.29 |
| **V** | 0.00 | 0.00 | 0.00 | 0.52 | 0.00 | 10.24 | 10.29 | 0.00 | 4.36 | 56.20 | 2.34 | 73.57 | 59.77 | 38.49 b | 2.50 | 2.37 | 27.47 | 2.53 | 2.90 | 10.25 | 10.29 |
| **A1** | 0.00 | 0.00 | 0.00 | 0.00 | 0.28 | 1.03 | 2.31 | 83.07 | 81.51 | 80.39 | 55.84 | 51.24 | 51.25 | 66.4 9 | 0.00 | 7.91 | 27.47 | 0.00 | 8.81 | 1.00 | 3.37 |
| **A2** | 4.72 | 0.00 | 0.00 | 0.00 | 0.00 | 10.09 | 0.86 | 2.72 | 4.42 | 6.48 | 7.25 | 4.33 | 10.49 | 3.94 | 0.29 | 0.67 | 1.24 | 0.44 | 0.23 | 1.11 | 0.70 |
| **Fines %** | **B** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.01 | 0.03 | 0.02 | 0.03 | 0.04 | 0.10 | 33.35 | 0 | 0 | 0 | 0 | 1.06 | 1.11 | 2.79 |
| **V** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.67 | 0 | 0 | 0.28 | 0 | 0 | 0 | 0 | 0 | 0 | 2.79 |
| **A1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.19 | 0 | 0 |
| **A2** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.02 | 0.07 | 0.26 | 0.22 | 0.18 | 0.39 | 0.51 |
| **Granulometry classification** | **B** | F.S | F.S | F.S | F.S | F.S | F.S | F.S | F.S | F.S | F.S | F.S | F.S | F.S | V.F.S | F.S | F.S | F.S | F.S/V.F.S | F.S | F.S | F.S |
| **V** | F.S | M.S/F.S | F.S | F.S | F.S | F.S | F.S | F.S | F.S | F.S | F.S | V.F.S | V.F.S | V.F.S | F.S | F.S | F.S | F.S | F.S | F.S | F.S |
| **A1** | F.S | F.S | F.S | F.S | F.S | F.S | F.S | F.S | F.S | F.S | F.S | F.S | F.S | F.S | F.S | F.S | F.S | F.S | F.S/V.F.S | F.S | F.S |
| **A2** | F.S | F.S | F.S | F.S | F.S | F.S | F.S | F.S | F.S | F.S | F.S | F.S | F.S | F.S | F.S | F.S | F.S | F.S | F.S | F.S | F.S |
| **Sorting Classification** | **B** | V.W.S | W.S / V.W. S | V.W.S | V.W.S | W.S / V.W. S | V.W.S | W.S / V.W. S | W.S / V.W. S | W.S / V.W. S | M.S | V.W.S | V.W.S | W.S / V.W. S | M.S | V.W.S | V.W.S | V.W.S | V.W.S | W.S / V.W. S | V.W.S | W.S / V.W. S |
| **V** | V.W.S | W.S/M.S | V.W.S | V.W.S | W.S/M.S | V.W.S | W.S | W.S | W.S | W.S / V.W. S | W.S | V.W.S | V.W.S | W.S / V.W. S | V.W.S | V.W.S | V.W.S | W.S | V.W.S | W.S / V.W. S | W.S |
| **A1** | W.S / V.W. S | W.S / V.W. S | V.W.S | V.W.S | W.S / V.W. S | W.S | V.W.S | V.W.S | V.W.S | V.W.S | V.W.S | V.W.S | V.W.S | V.W.S | W.S / V.W. S | V.W.S | V.W.S | V.W.S | V.W.S | W.S | V.W.S |
| **A2** | V.W.S | V.W.S | V.W.S | V.W.S | V.W.S | V.W.S | V.W.S | W.S / V.W. S | W.S / V.W. S | M.S | V.W.S | V.W.S | W.S / V.W. S | M.S | V.W.S | V.W.S | V.W.S | V.W.S | V.W.S | V.W.S | V.W.S |
| **Compactation (Kg.F/cm²)** | **B** | 13.5±0.70 | 15.5±0.70 | 14 | 16.5±2.12 | 17±1.41 | 15.5±0.70 | 15±1.41 | 11.5±2.12 | 10.5±0.70 | 10.5±0.70 | 13.5±2.12 | 12±1.41 | 13.5±0.70 | 12.5±2.12 | 4.5±0.70 | 5.5±0.70 | 5 | 6±1.41 | 9±1.41 | 10.5±0.70 | 11±1.41 |
| **V** | 19±1.41 | 20 | 15.5±0.7 | 15.5±0.7 | 18.5±2.1 | 16.5±0.7 | 16 | 20 | 20 | 17±1.41 | 14.5±0.7 | 11.5±2.1 | 16±1.41 | 14±1.41 | 12.5±0.7 | 12.5±2.1 | 16±1.41 | 16±2.82 | 16±2.82 | 12 | 13±1.41 |
| **A1** | 16±1.41 | 16.5±0.7 | 14 | 16.5±0.7 | 15 | 15.5±0.7 | 17 | 15.5±4.94 | 16±2.82 | 15±4.24 | 14±1.41 | 14.5±0.7 | 14±4.2 4 | 14.5±2.1 | 7.5±0.7 | 6±1.41 | 7 | 10.5±2.1 | 12±4.24 | 12±1.41 | 12.5±2.1 |
| **A2** | 14.5±0.70 | 16±1.41 | 14 | 14±1.41 | 14±2.82 | 13±1.41 | 12±2.82 | 13.5±3.53 | 14.5±0.7 | 13±1.41 | 13.5±0.7 | 13 | 13±2.82 | 12±2.82 | 7.5±3.53 | 6.5±2.12 | 8±2.82 | 9±1.41 | 10 | 9±1.41 | 11.5±0.70 |

**\*B: Before, V: Vacation, A1: After 1, A2: After 2; FS: Fine sand, V.F.S: Very fine sand, W.S: Well sorted, V.W.S: Very well sorted.**