

Table DR1a: Physical characteristic of the regoliths

| For 1 m ² parcel | FLOOD BASALT | | GRANODIORITE and TONALITE | |
|--|--------------|-------|------------------------------|--------|
| | Loess | Sand | Loess | Sand |
| Density of regolith (kg.m ⁻³) | 3 | 3 | 2.7 | 2.7 |
| Grain size (μm) | 50 | 2000 | 50 | 2000 |
| Thickness of soil (m) | 1 | 0.1 | 1 | 0.1 |
| Specific surface (m ² .kg ⁻¹) | 0.04 | 0.001 | 0.044 | 0.0011 |
| A/V: Reactive surface/ water volume (m ⁻¹) | 480 | 12 | 480 | 11.85 |
| Runoff (m.yr ⁻¹) | 0.2 | 0.01 | 0.2 | 0.01 |
| Residence time (yr) | 1 | 2 | 1 | 2 |
| Fraction of pore water volume renewed after each rain event | 1/50 | 1/8 | 1/50 | 1/8 |

**Table DR1b: Rate constants (Berger et al. 2002; Fabre et al. 2011)
used in the various modelling per minerals and type of rock.**

| BASALT | | Loess | Sand |
|-----------------------------|----------------------------|--|---|
| Rock forming minerals | % of mineral surface | k _o (T= 40°C) in mole Si.m ⁻² .s ⁻¹ | A/V in m ⁻² /m ⁻³ |
| Albite | 24 | 3.3E-12 | 110 |
| Anorthite | 23 | 5.0E-12 | 105 |
| K-feldspar | 8 | 3.3E-12 | 33 |
| Diopside | 20 | 5.0E-12 | 91 |
| Hedenbergite | | 5.0E-12 | 86 |
| e | 19 | | 2.3 |
| Ilmenite | 6 | 6.1E-10 | 28 |
| Magnetite | 0.1 | 1.7E-08 | 0.02 |

| GRANODIORITE | | | Loess | Sand |
|-----------------------|----------------------|--|---|------|
| Rock forming minerals | % of mineral surface | k_o (T= 40°C) in mole Si.m ⁻² .s ⁻¹ | A/V in m ⁻² /m ⁻³ | |
| Quartz | 25 | 1.0E-11 | 120 | 3 |
| Albite | 25 | 3.3E-12 | 120 | 3 |
| Anorthite | 19 | 5.0E-12 | 91 | 2.3 |
| Orthose | 13 | 3.3E-12 | 62 | 1.5 |
| Phlogopite | 4 | 3.3E-12 | 19 | 0.5 |
| Annite | 8 | 1.3E-12 | 38 | 1 |
| Tremolite | 6 | 1.3e-12 | 29 | 0.7 |

| TONALITE | | | Loess | Sand |
|-----------------------|----------------------|--|---|------|
| Rock forming minerals | % of mineral surface | k_o (T= 40°C) in mole Si.m ⁻² .s ⁻¹ | A/V in m ⁻² /m ⁻³ | |
| Quartz | 20 | 1.0E-11 | 120 | 3 |
| Albite | 29.8 | 3.3E-12 | 133 | 3.3 |
| Anorthite | 13.8 | 5.0E-12 | 51 | 1.3 |
| K-feldspar | 5 | 3.3E-12 | 5 | 0.1 |
| Phlogopite | 6.5 | 3.3E-12 | 40 | 1 |
| Annite | 5.5 | 3.3E-12 | 31 | 0.8 |
| Amphibole | 5 | 1.3E-12 | 24 | 0.6 |
| Diopsid | 9 | 5.0E-12 | 43 | 1.1 |
| Hedenbergite | | 5.0E-12 | 28 | 0.7 |
| e | 5 | | | |

