How to identify groundwater caused thermal anomalies in lakes based on multi-temporal satellite data in semi-arid regions


Supplement:

Table S1: Recording and atmospheric parameter for applied data (Trans = Transmissivity, Up = Upwelling Radiances [W·m⁻²·sr⁻¹·μm⁻¹], Down = Downwelling Radiances [W·m⁻²·sr⁻¹·μm⁻¹])

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<th>Lon</th>
<th>Trans</th>
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<th>Down</th>
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Table S2: Comparison of Recording Dates, Rainfall Events and minimum values of SRT-CAT – grey-shaded are all images that are indicated as surface discharge influenced by exhibiting at least one value below the threshold of -0.053 - Abbreviations: TD – Time difference [days], TR – Total amount of rain per event [mm], ED – Event duration [days], MI – Maximum intensity [mm], Min IF – Minimum value after SRT-CAT

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<th>TR</th>
<th>ED</th>
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<th>Min IF</th>
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* Information derived from TRMM data where total amount per event and event duration are inappropriate to infer
Table S3: Recording dates vs. rain occurrence and intensity for all rain stations and TRMM_34B2 data – Abbreviations: RD – Recording date of image, TD - Time difference between RD and the respective station/TRMM [days], MI - maximum intensity of the rain event [mm]

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* Information derived from TRMM data where total amount per event and event duration are inappropriate to infer
Fig. S1: Last rain occurrence according to TRMM prior to Landsat data recording
Table S4: Explanation of Volume calculation

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<td>Determination of fan area:</td>
<td>manual digitalisation using the cliff as western boundary and the DS as eastern boundary</td>
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</table>
| Volume calculation: | 1. creating an upper plane representing the current topographical surface by extracting the before determined fan area from the ASTER GDEM  
| | 2. creating a tilted lower plane by applying the calculation: \( X_i Y_i - (X_i Y_i - \text{Min}) \) on the upper plane  
| | 3. calculating the volume using the “Cut Fill” function of ArcGIS. using upper and lower plane as input parameter |

Table S5: Parameter used for pore runoff calculation

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<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
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<td>( h_a )</td>
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</tr>
<tr>
<td>( n_{\text{pores}} )</td>
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<td>( h_b )</td>
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<tr>
<td>Material</td>
<td>Gravel</td>
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<tr>
<td>( K_f )</td>
<td>( 10^{-2} ) *</td>
<td>( A )</td>
<td>( 33 \cdot 10^3 )</td>
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*Values after Hölting and Coldewey 2005