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In-situ Observation on Rainfall Infiltration in Loess

Li ping
Department of Geological Engineering, Chang’an University, China
Japan
October, 2012

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2. Introduction of monitoring area
3. Monitoring site and instrument arrangement
4. Analysis of the monitoring results
5. Problem discussion

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Rainfall distribution
Landslides distribution

Introduction
The natural and artificial rainfall tests to determine the depth of rainfall infiltration previously

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Introduction
Introduction of monitoring area

Location of the monitoring area

Arid climate condition

Loess and paleosol interbedded

Loess is dry, paleosol is wet.

Monitoring site and instrument arrangement

Rain gauge

Moisture content probe

21 in total

Monitoring site and instrument arrangement

Physical and mechanical indexes

<table>
<thead>
<tr>
<th>Loess</th>
<th>Paleosol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulk density (g/cm³)</td>
<td>1.44</td>
</tr>
<tr>
<td>Dry density (g/cm³)</td>
<td>1.24</td>
</tr>
<tr>
<td>Moisture content (%)</td>
<td>16.7</td>
</tr>
<tr>
<td>Saturated moisture content (%)</td>
<td>43.8</td>
</tr>
<tr>
<td>Specific gravity</td>
<td>2.76</td>
</tr>
<tr>
<td>Void ratio</td>
<td>1.977</td>
</tr>
<tr>
<td>Plastic limit (%)</td>
<td>21.7</td>
</tr>
<tr>
<td>Liquid limit (%)</td>
<td>29.4</td>
</tr>
<tr>
<td>Compressibility coefficient (MPa⁻¹)</td>
<td>8.82</td>
</tr>
<tr>
<td>Coefficient of collapsibility</td>
<td>0.079</td>
</tr>
<tr>
<td>Vertical coefficient of permeability (m/s)</td>
<td>2.55×10⁻⁸</td>
</tr>
<tr>
<td>Horizontal coefficient of permeability (m/s)</td>
<td>1.72×10⁻⁸</td>
</tr>
<tr>
<td>Clay content (g/cm³)</td>
<td>17.6</td>
</tr>
</tbody>
</table>

Monitoring site and instrument arrangement

Analysis of the monitoring results

High moisture content

More volatile

Affected greatly by rainfall and evaporation

Low moisture content

Minor changed

High moisture content

Influenced by stratum structure
Analysis of the monitoring results

Temperature, evaporation and rainfall changed in annual cycle

The moisture content of layers within 2 meters were also changed in annual cycle.

The rainfall which can cause the mutation of moisture content is about 18 mm/d.

Periodically stable
Increased smoothly
Non-annual change

Problem discussion

What is the main factor that affect the annual variation of the background value of moisture content?

How far can the moisture migrate in unsaturated zone in loess tableland which groundwater level is often very deep? Whether it can reach the groundwater level and become the main part to supplement groundwater?