

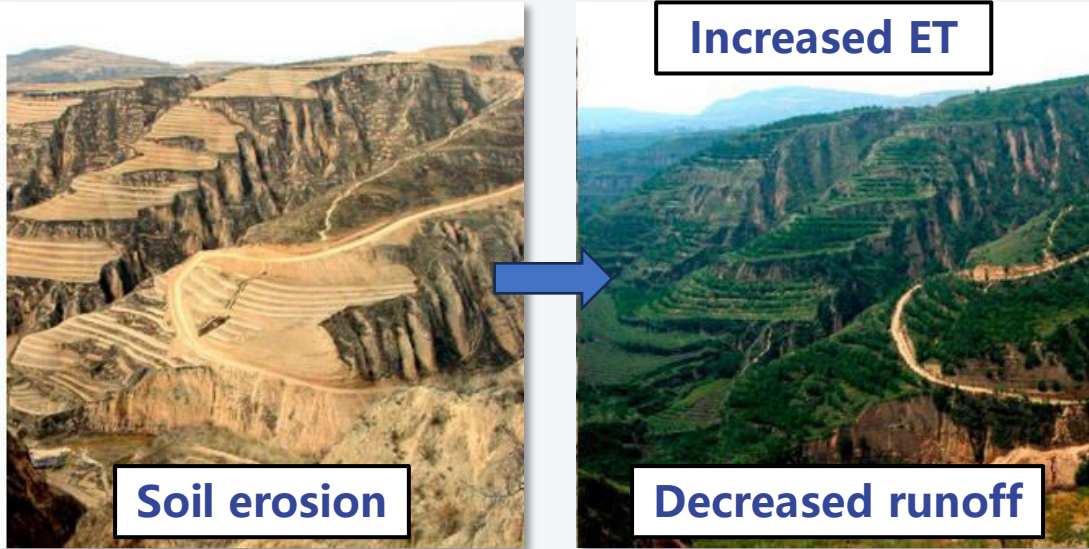


Rainfall-Infiltration in Growing and Non-growing Seasons on the Loess Plateau

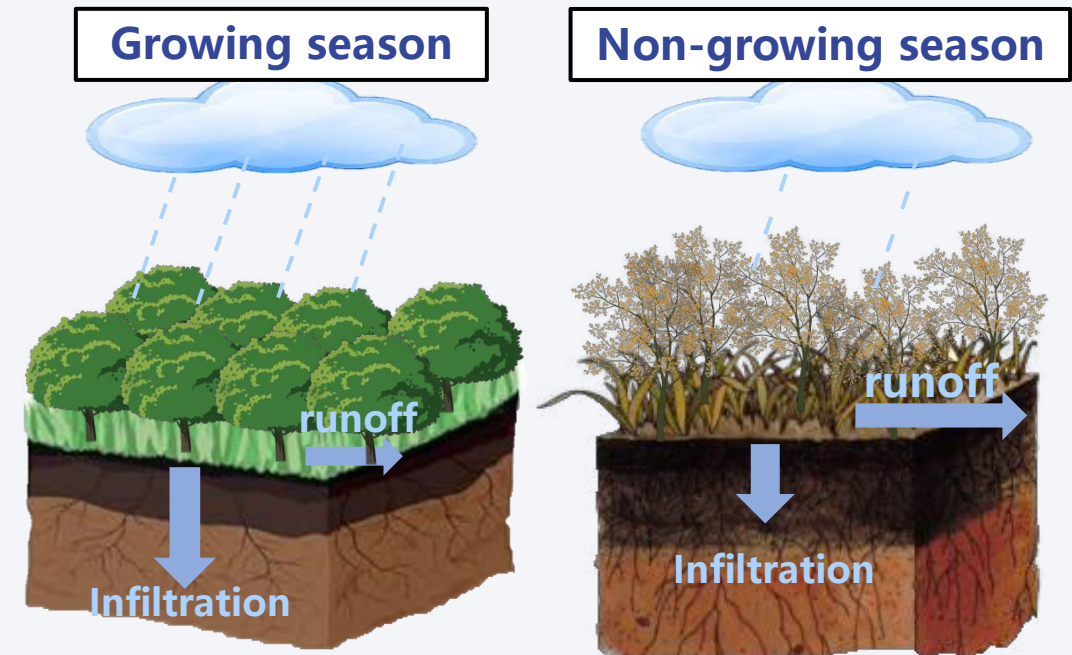
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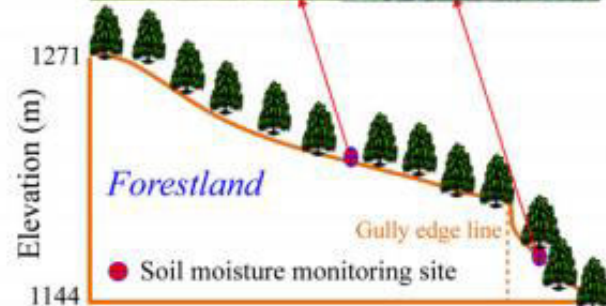
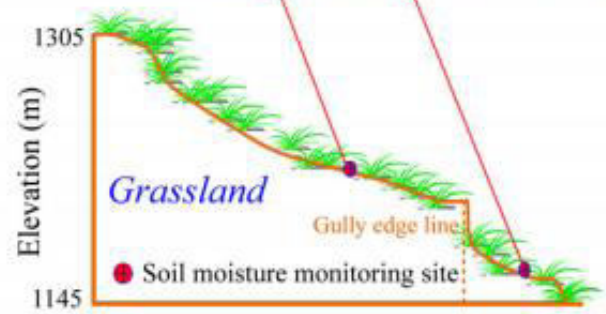
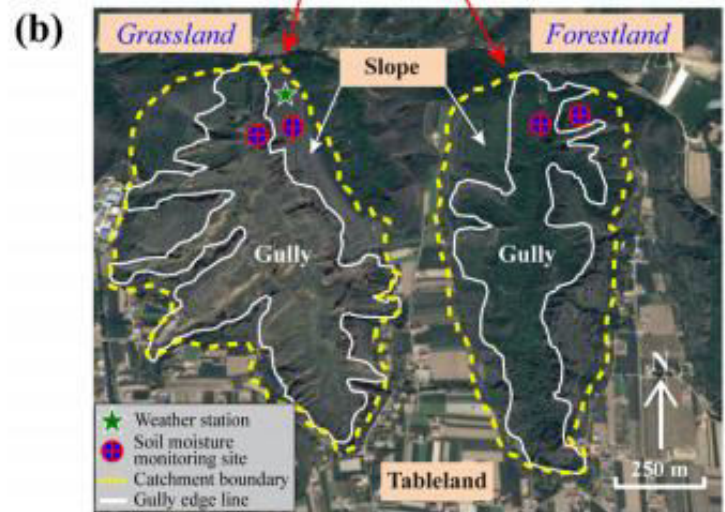
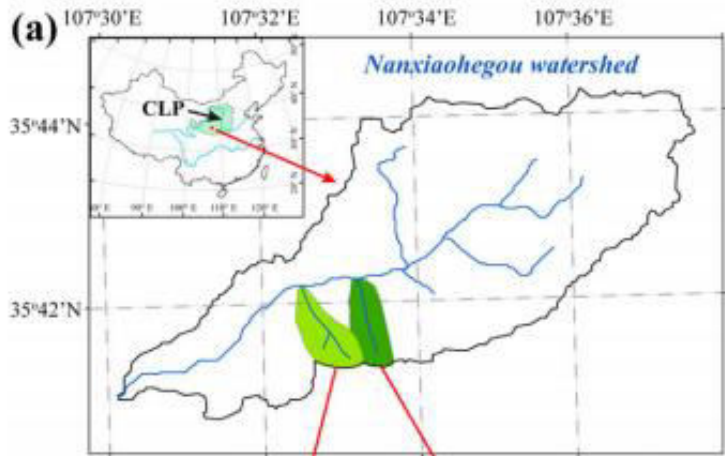
Rainfall-infiltration mechanism on the Loess Plateau have **changed** dramatically.



Rainfall infiltration mechanism during **both** the **growing season** and **non-growing season** is crucial.

In the growing season and non-growing season:

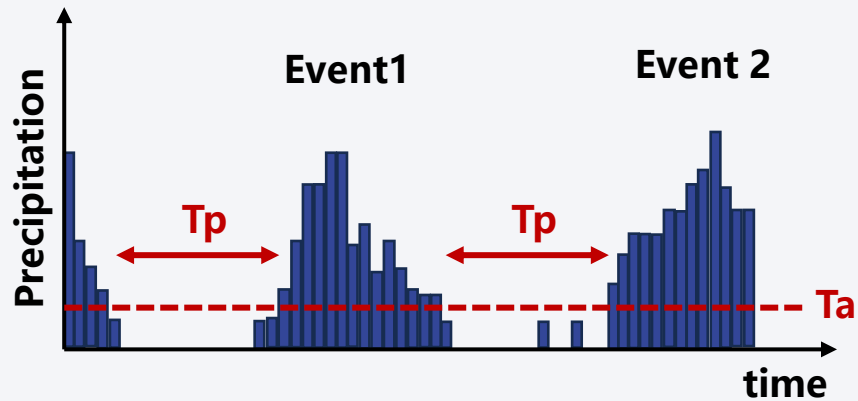
1. How does soil moisture respond differently to rainfall?
2. What are the differences in soil moisture infiltration pathways?
3. How soil moisture storage varies?



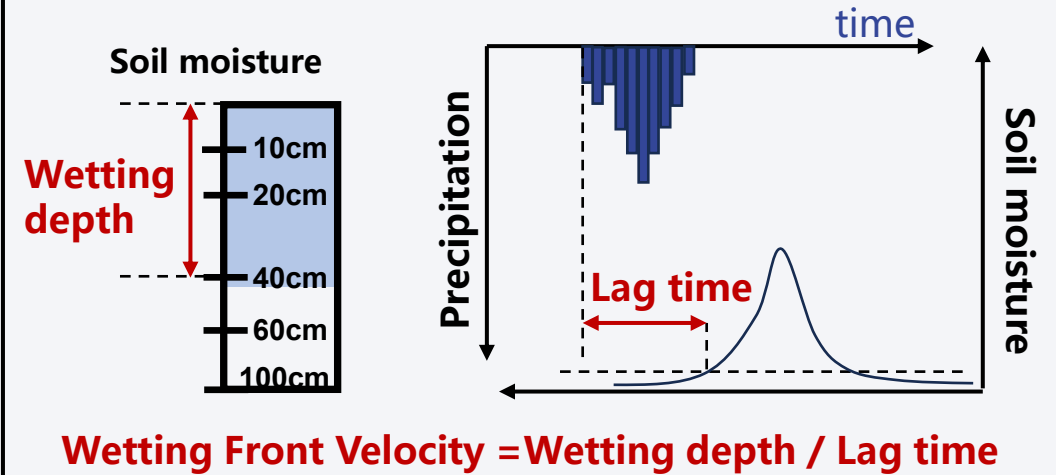
NanXiaohegou catchment, Qingyang City, Gansu Province

- **Grassland (1.15km²):** natural recovery of vegetation (Figure c)
- **Forestland (0.87km²):** artificial reforestation (Figure d)
- **Soil moisture monitoring:** uphill and downhill, 5 soil depths (10, 20, 40, 60, 100cm)
- **Rainfall monitoring:** automatic weather station
- **Data:** 2016.5-2018.12 at 10-minute intervals

RAINFALL EVENTS DELINEATION:

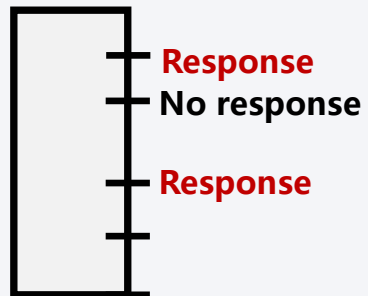


SOIL MOISTURE RESPONSE:

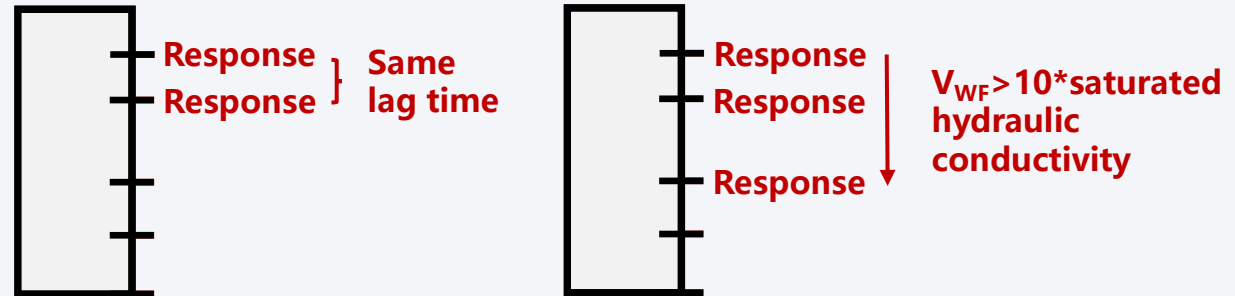


PREFERENTIAL FLOW:

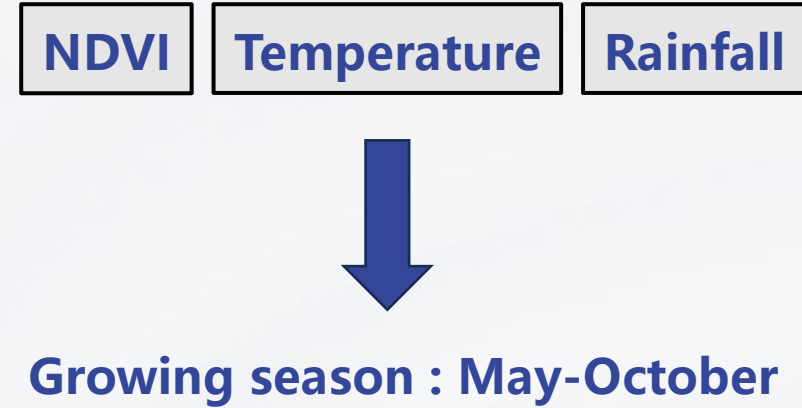
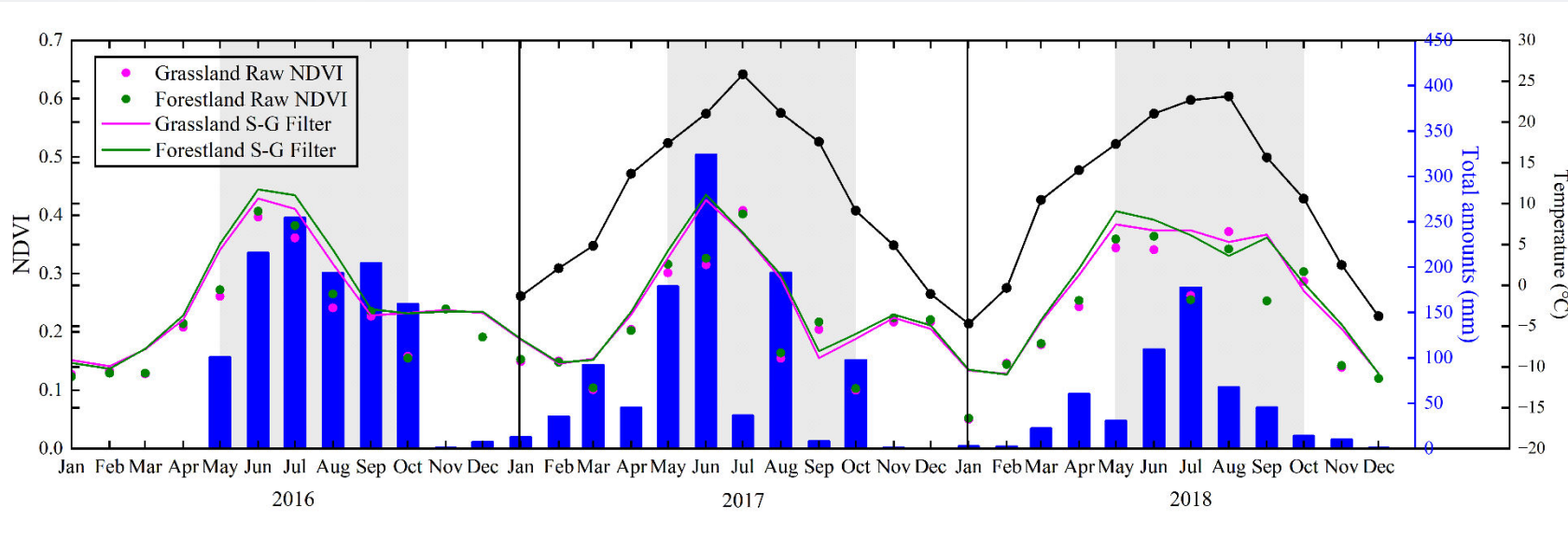
1 Non-sequential preferential flow



2 Velocity-based preferential flow



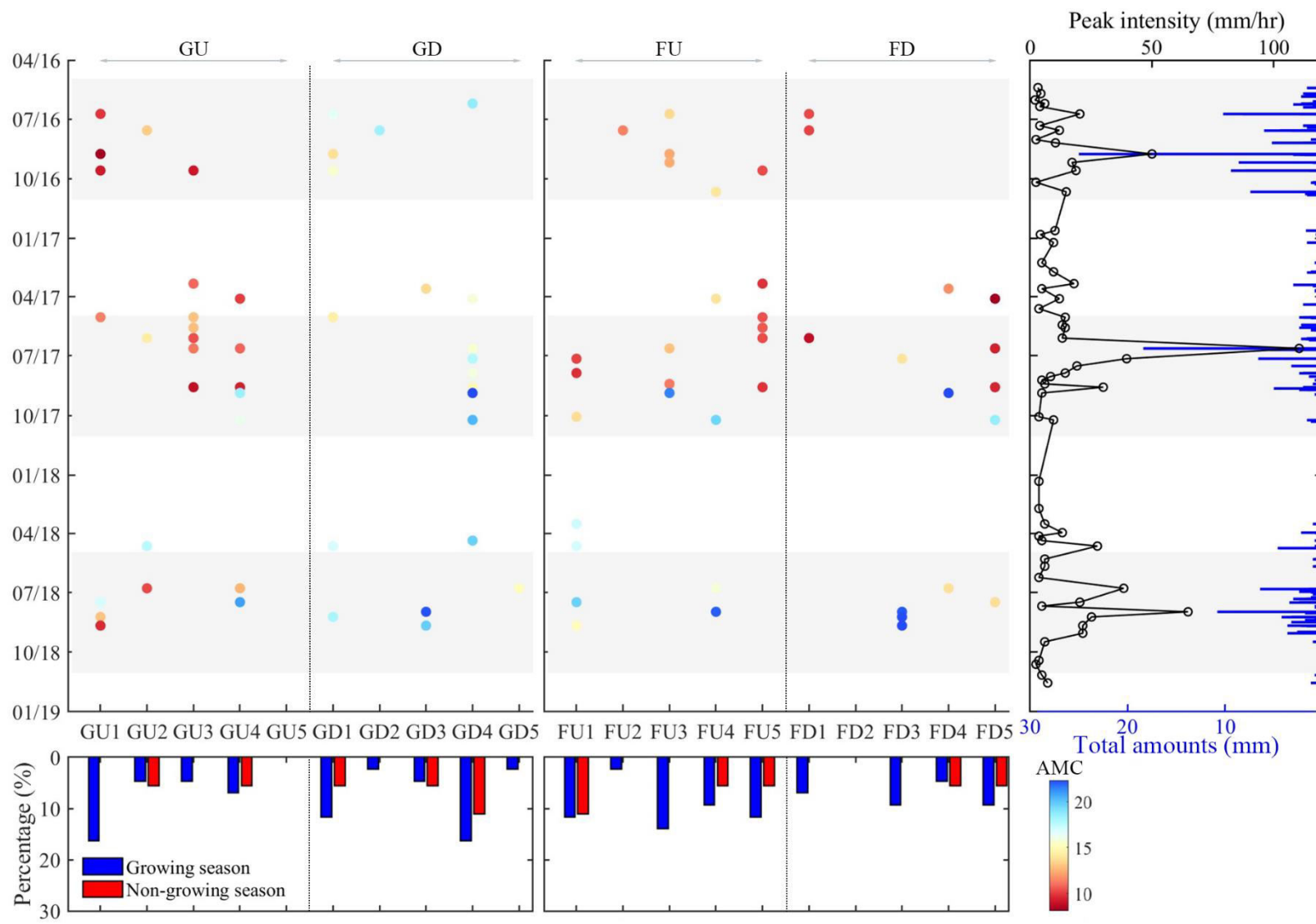
4 RESULTS: Environmental factors



	Growing season	Non-growing season	Mann-Whitney U
NDVI	0.28	0.16	P<0.001*
Temperature (°C)	18.54	3.43	P<0.001*
Duration (hr)	43.57	29.78	P<0.001*
Total amounts (mm)	34.71	12.14	P<0.001*
Peak intensity (mm/hr)	16.33	8.40	P<0.001*
Average intensity (mm/hr)	5.44	5.95	P>0.001

Significant difference in environmental variables between growing and non-growing season.

4 RESULTS: Wetting Depth



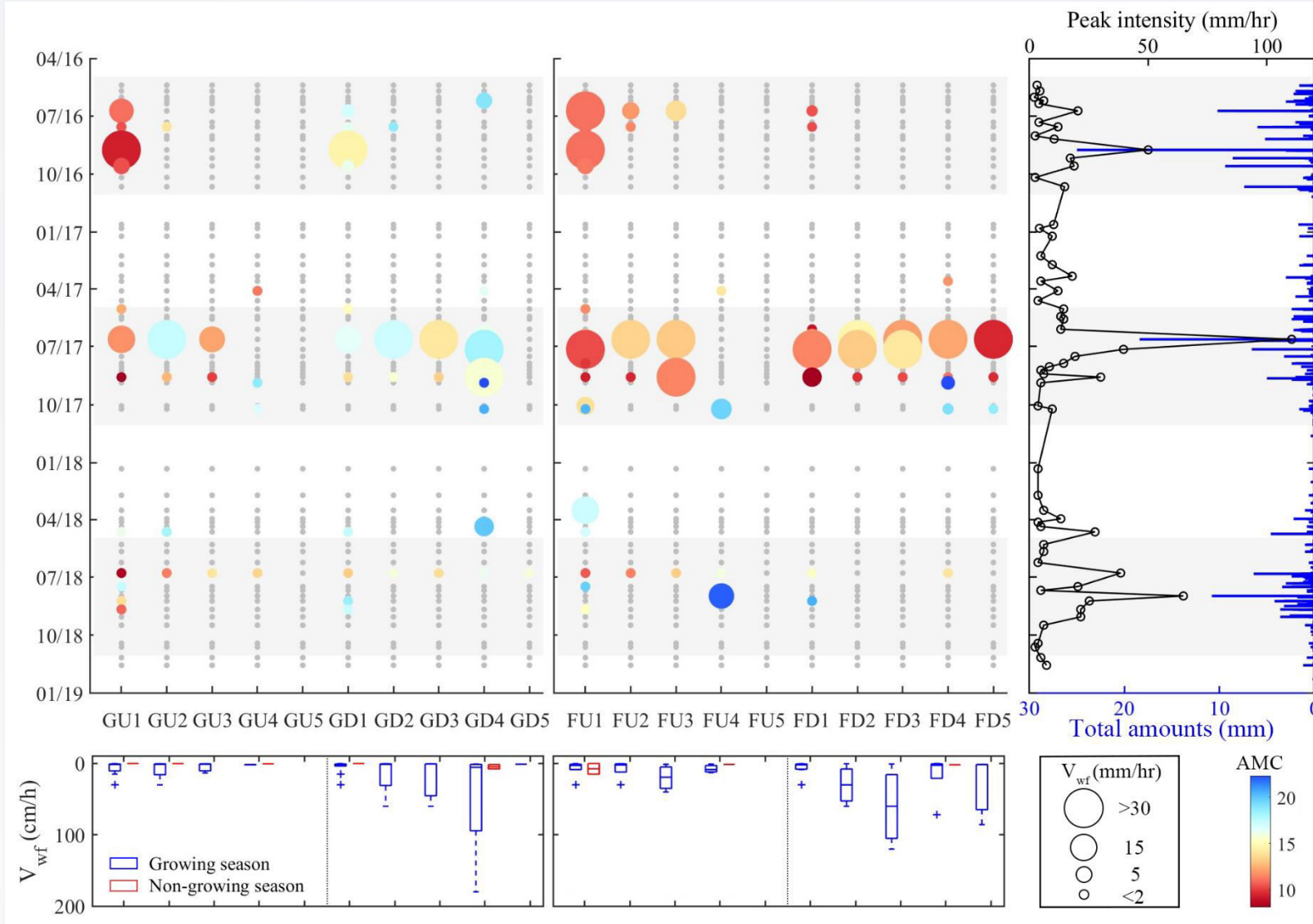
Compared with non-growing season:

- **More response events in growing season**
- **Deeper wetting depths in the growing season**

Deeper wetting depth:

- **Higher Peak intensity**
- **More rainfall amounts**
- **Lower AMC (antecedent moisture conditions)**

4 RESULTS: Wetting Front Velocity



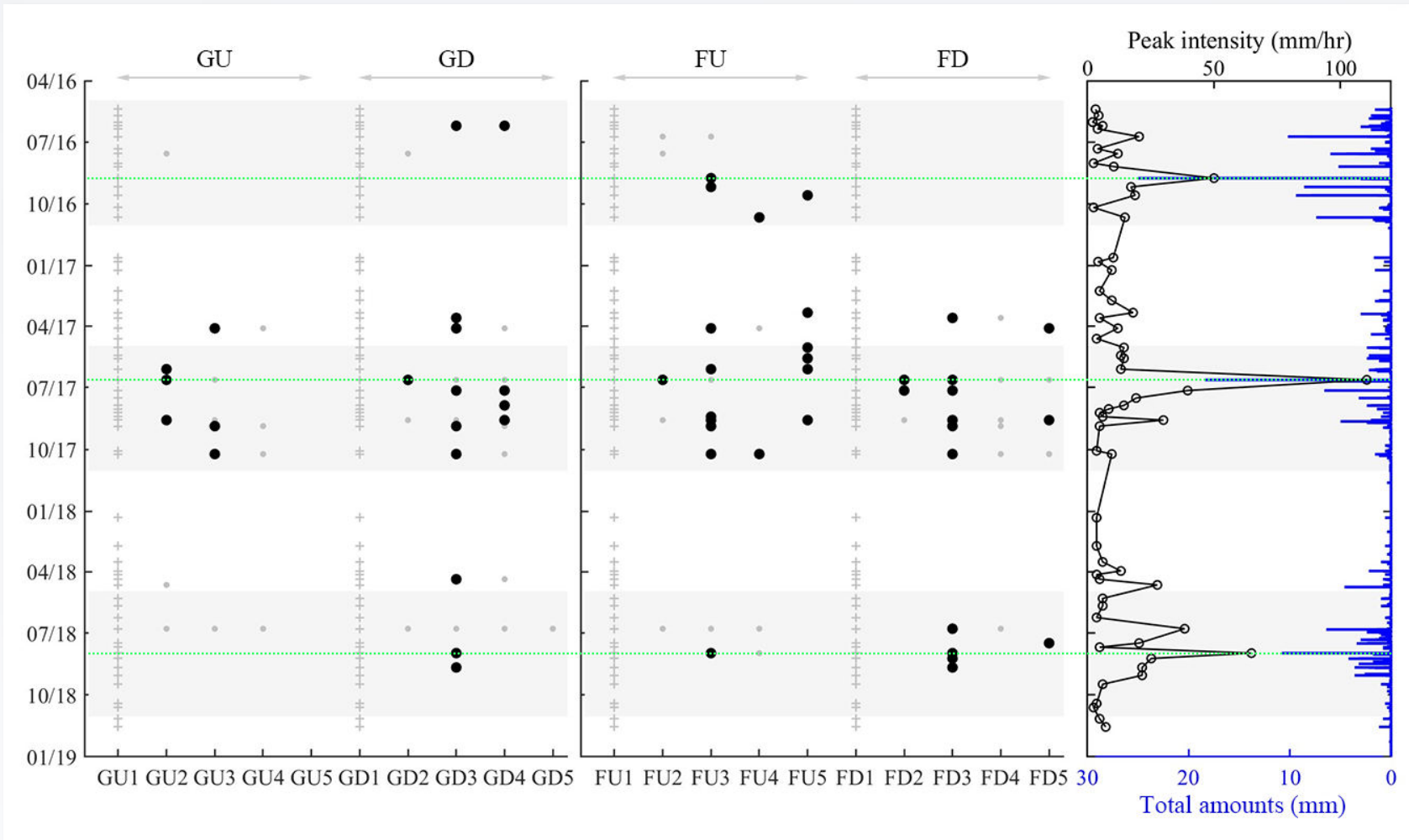
Compared with non-growing season:

- **Faster wetting front velocity** in growing season

Faster wetting front velocity :

- **Higher Peak intensity**
- **More rainfall amounts**
- **Lower AMC (antecedent moisture conditions)**

4 RESULTS: Preferential Flow



Compared with non-growing season:

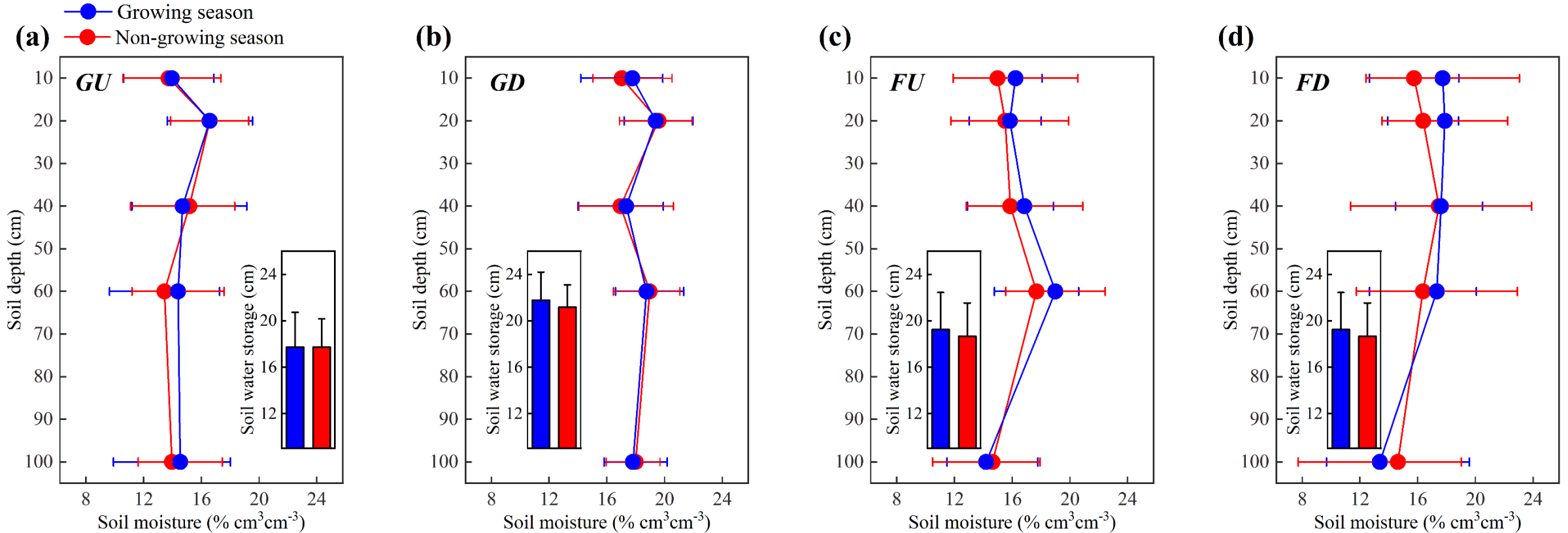
- **More preferential flow events** in growing season

Faster wetting front velocity :

- **Higher Peak intensity**
- **More rainfall amounts**

4 RESULTS: Soil Water Storage

Growing soil water storage is greater than non-growing season.



- **Growing season : Deeper wetting depth; Faster wetting front velocity; More preferential flow events**
- **Non-growing season: Lower soil moisture depletion**

Growing season

Non-growing season

**Soil moisture
replenishment**

- Higher Peak intensity
 - More rainfall amounts
- ↓
- More response events
 - Deeper wetting depth;
 - Faster wetting front velocity;
 - More preferential flow

- Lower Peak intensity
 - Less rainfall amounts
- ↓
- Less response events
 - Shallower wetting depth;

**Soil moisture
depletion**

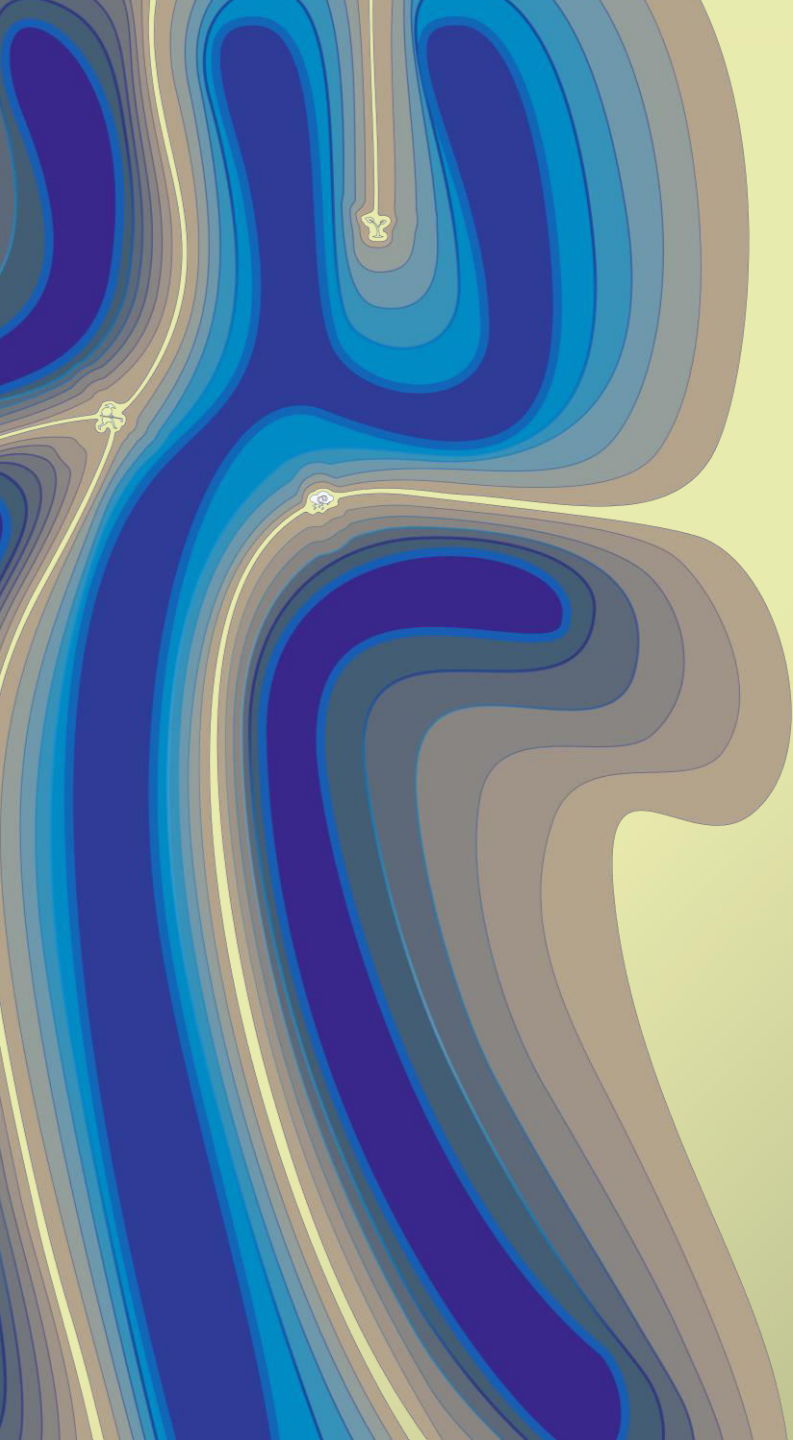
More evaporation

Less evaporation

**Soil water
storage**

More SWS

Less SWS



THANK YOU

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