

# Characterizing the effect of surface topography on Nitrogen transport through simulation modeling

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## Introduction

- The transport of nitrogen in the soil is known to be influenced by field topography (i.e. summit, slope, and depression areas within the same field)
- This is caused by variations in soil properties (such as percentage of sand, clay) and elevation between different areas

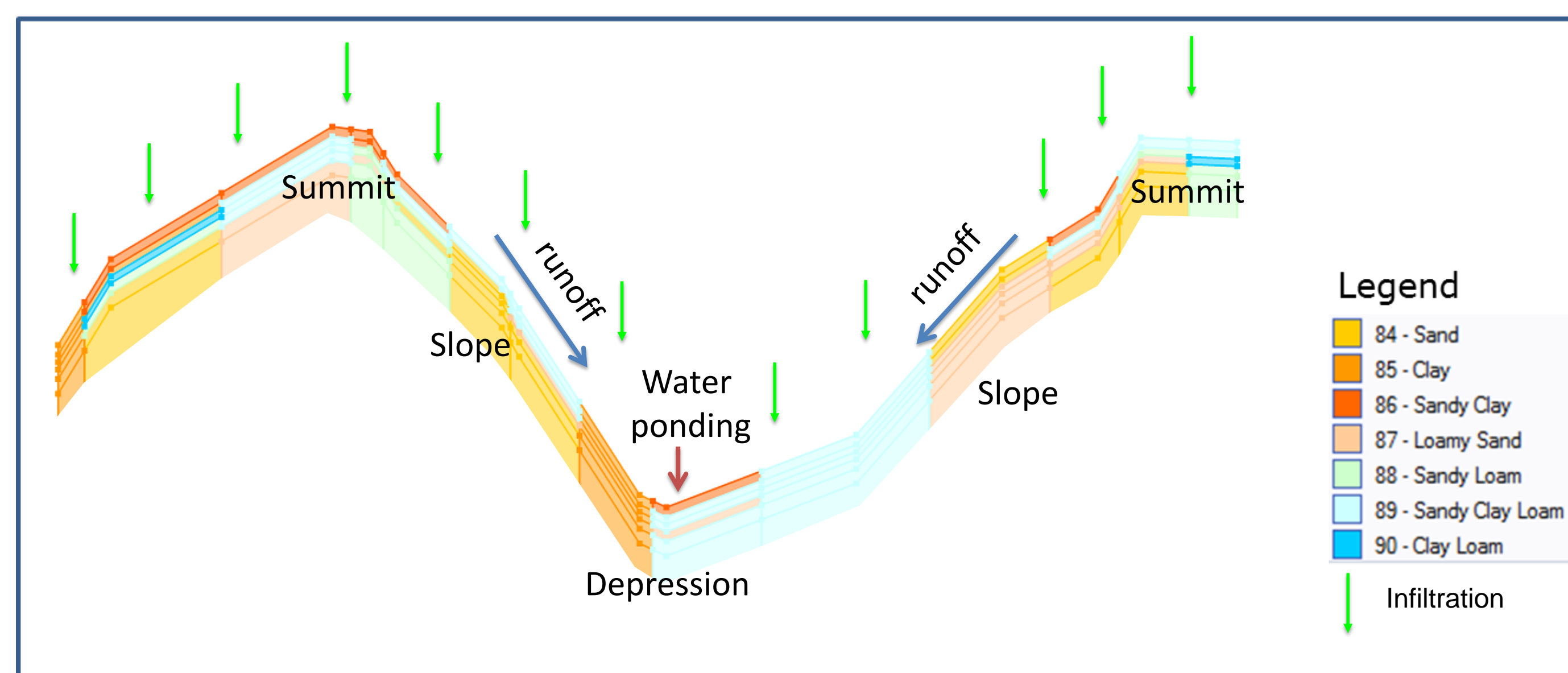
## Study Objectives

- To study how field dynamics of Nitrate are influenced by topography during the growing season.
- To gain insight into the mechanisms behind these field dynamics using computer simulations of water flow and nitrogen transport.

## Practical Application

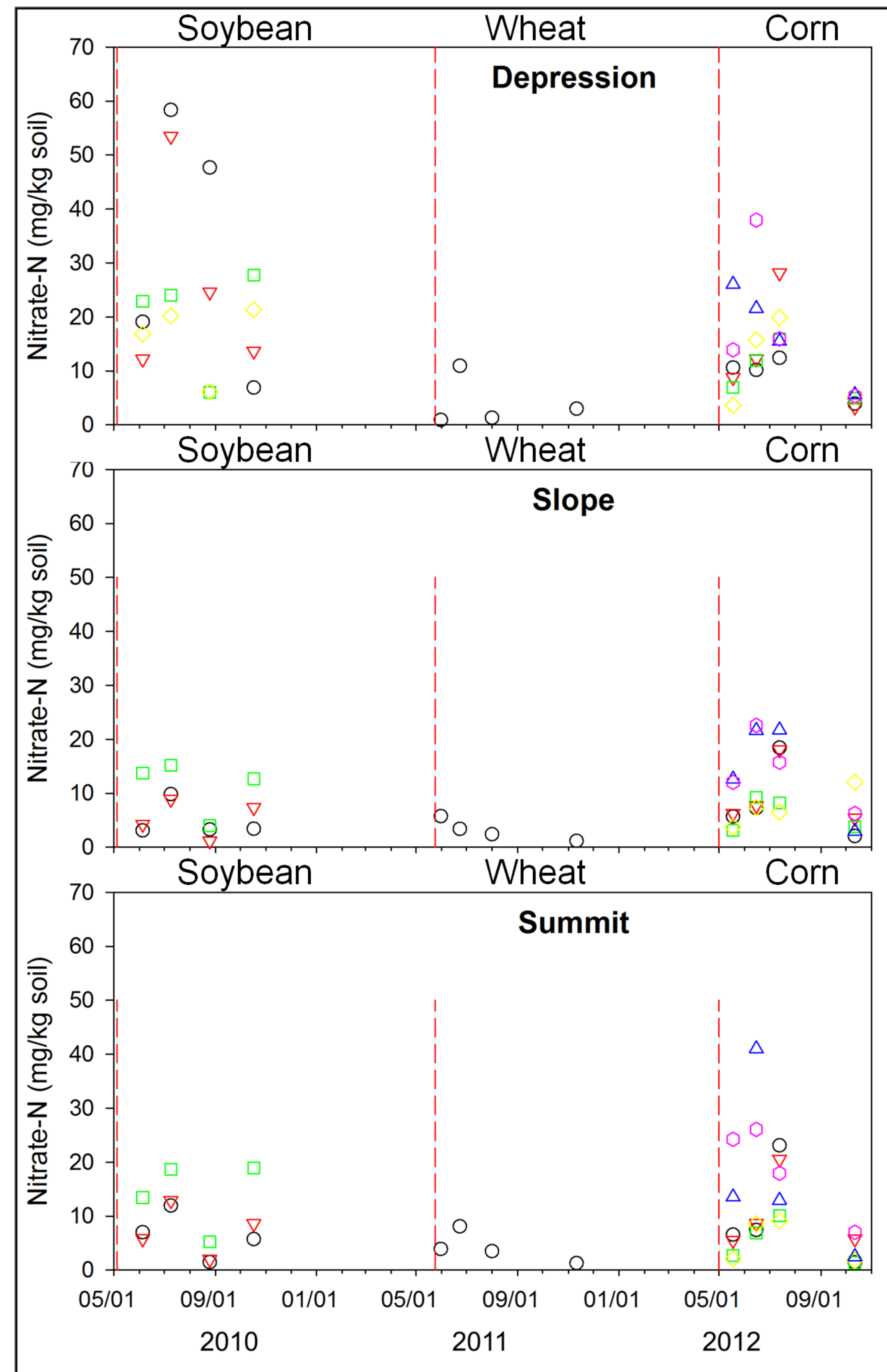
- Detailed knowledge of the mechanisms of soil nitrogen transport can be integrated into existing management practices. This knowledge will contribute to sustainable crop production by helping reduce nitrogen losses via runoff and deep infiltration.

## Soil texture and overland water flow direction at the three topographical elements

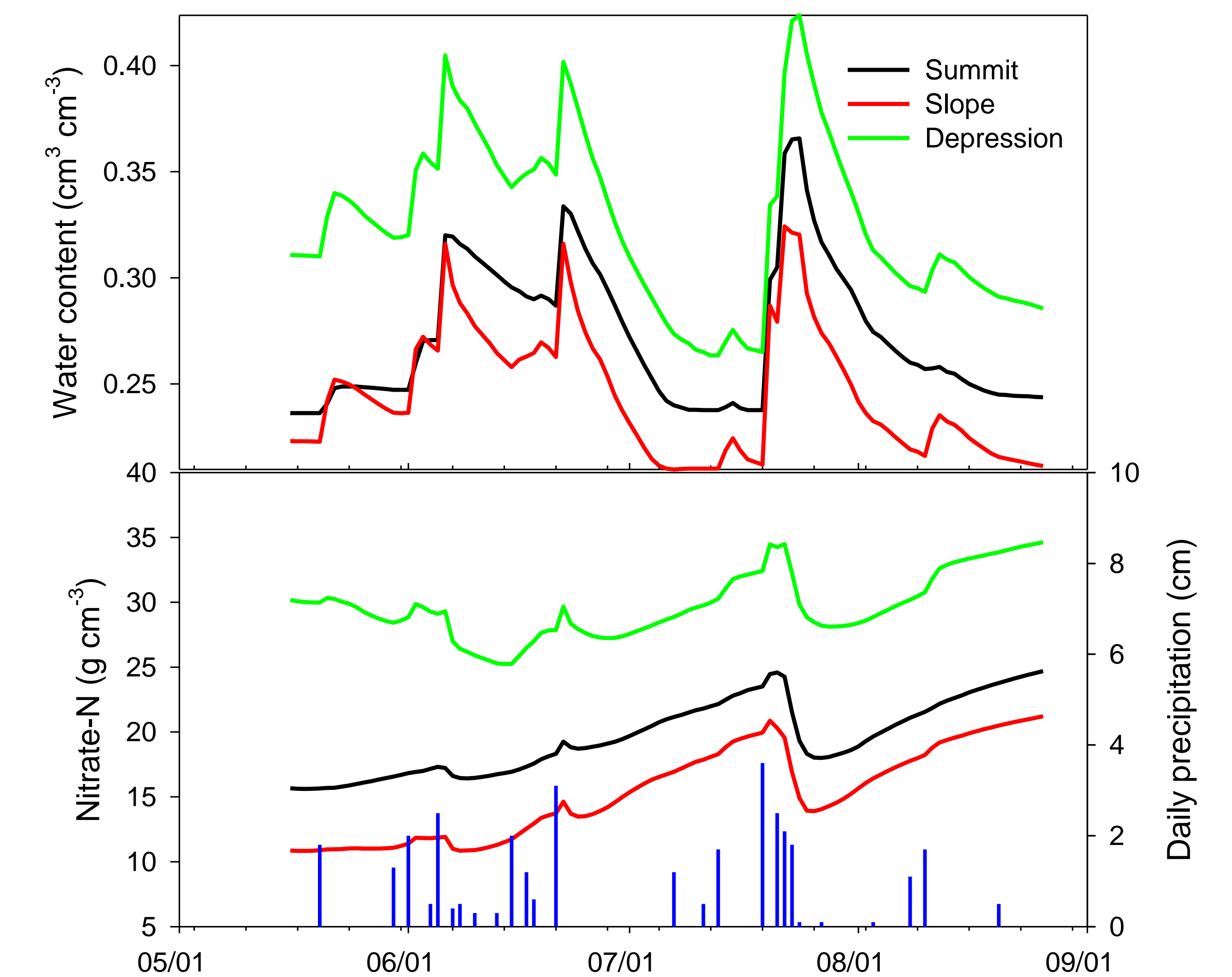


(elevation exaggerated for illustration purposes)

## Dynamics of Nitrate-N ( $\text{NO}_3\text{-N}$ ) measured in top 12" (30cm) soil layer at the three topographical elements



## Dynamics of water and $\text{NO}_3\text{-N}$ contents in the top soil layer simulated for 2010 weather conditions



## Conclusions

- Low infiltration in summit and slope areas poses the greatest risk for nitrogen losses via runoff
- Runoff results in overall lower soil water content in slope and summit areas compared to depression, reducing the nitrogen mineralization potential of the soil
- Management practices should be developed and implemented with respect to differences in hydrological conditions, and associated differences in nitrogen transformation and transport at topographical elements

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