

Understanding the dynamic fate of nitrate  
during wet season in a typical karstic  
agricultural catchment, SW China,  
constrained on dual nitrate isotopes

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Increased flows in storm events during the wet season can mobilise and leach catchment nitrate, likely accounting for a large proportion of the annual nitrate loading, we estimate up to 87.5% of total export. However, where nitrate comes from in these event exports should also be considered to fully understand flow pathways in the critical zone and how to manage nutrient loading. Conventional sampling techniques basing on daily or weekly sampling programs inadequately captured key pulses during short-term events. Thus in a typical agricultural karst catchment, we used nitrate sensors to generate detailed export time series (15 minute resolution) and isotopic measurements to identify the source of the nitrate (hourly resolution). In an early wet season event at Chenqi, with rainfall of 70 mm, after a drop in nitrate-N concentration, this then increased by 3.3mg/L during the recession limb of the event.  $\delta^{15}\text{N-NO}_3^-$  and  $\delta^{18}\text{O-NO}_3^-$  varied by 5.9‰ and 2.9‰ within the 24h event. During the rising limb, the nitrate isotope values decreased, but recovered on the recession limb of the event to be similar to pre-event. The the low isotopic composition nitrate exported during the event is understood to be chemical fertiliser which is isotopically-depleted. Similar patterns were observed in the following three events, but  $\delta^{18}\text{O-NO}_3^-$  values in each event became successively lower than the last one, suggesting new nitrified nitrate leached from catchment. Such combined time series and isotope characterisation offers insight as to the source of fluvial loading from which we can better understand nitrate dynamic change in karst critical zone. This presentation will provide further detail of such insight.