CRC for Water Sensitive Cities

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B 2.4 Hydrology and nutrient transport processes
In groundwater/surface water systems

Application of machine learning algorithms for nitrogen prediction in urban areas

Introduction

►Groundwater nutrients impact surface water quality but to what extent?

►Kriging interpolation method uses geological information but the hydrochemical processes are missing

►A hybrid method was created to combine both geological and hydrochemical information for groundwater dissolved organic nitrogen (DON) mapping

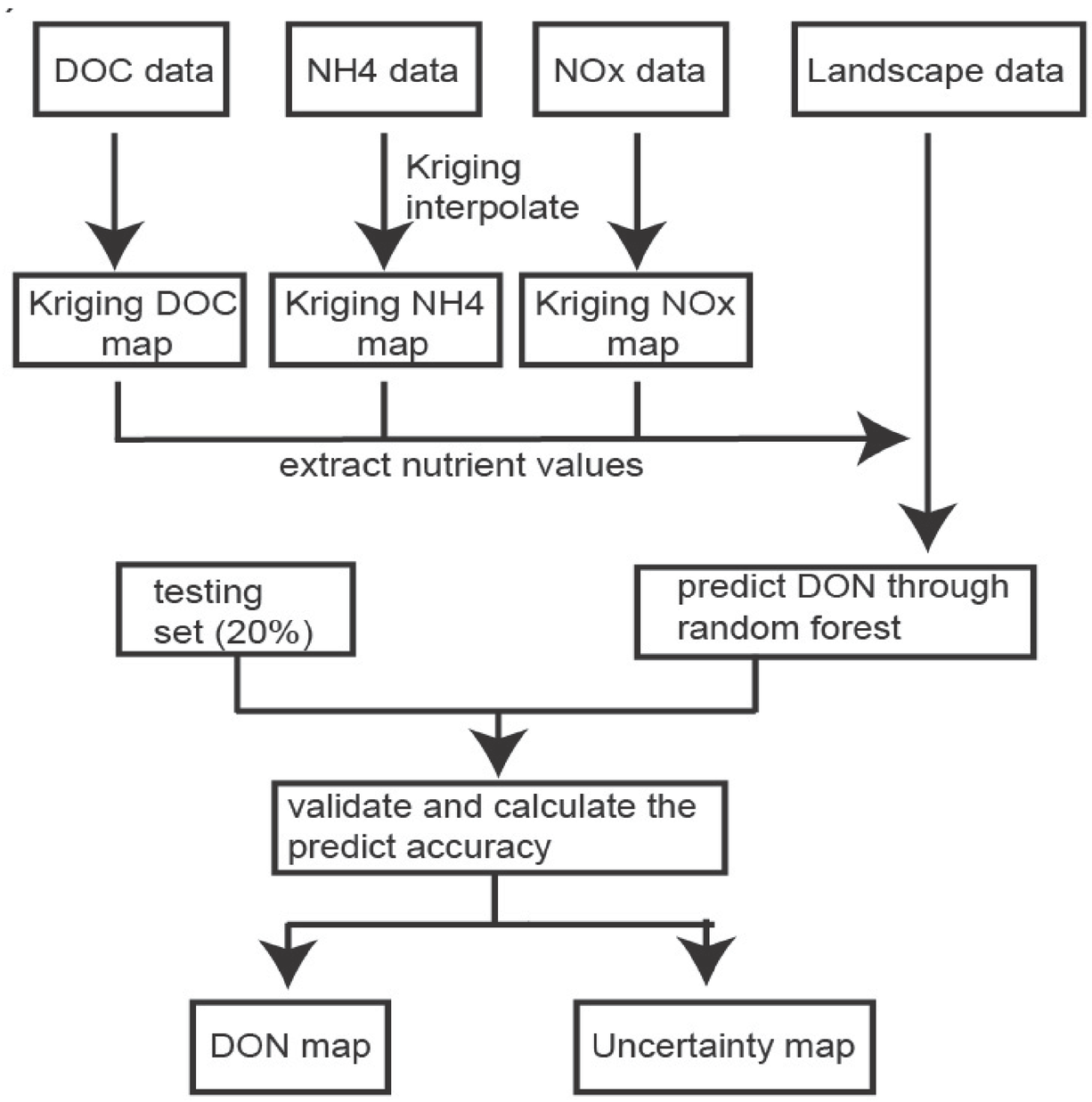

Fig 1. The modelling processes of the hybrid method

A hybrid method for groundwater nutrient mapping

Kriging was first applied to interpolate other important nutrient data

The Kriging nutrient data was combined with landscape data for a machine learning method to predict groundwater DON

The predicted results were validated by testing a dataset

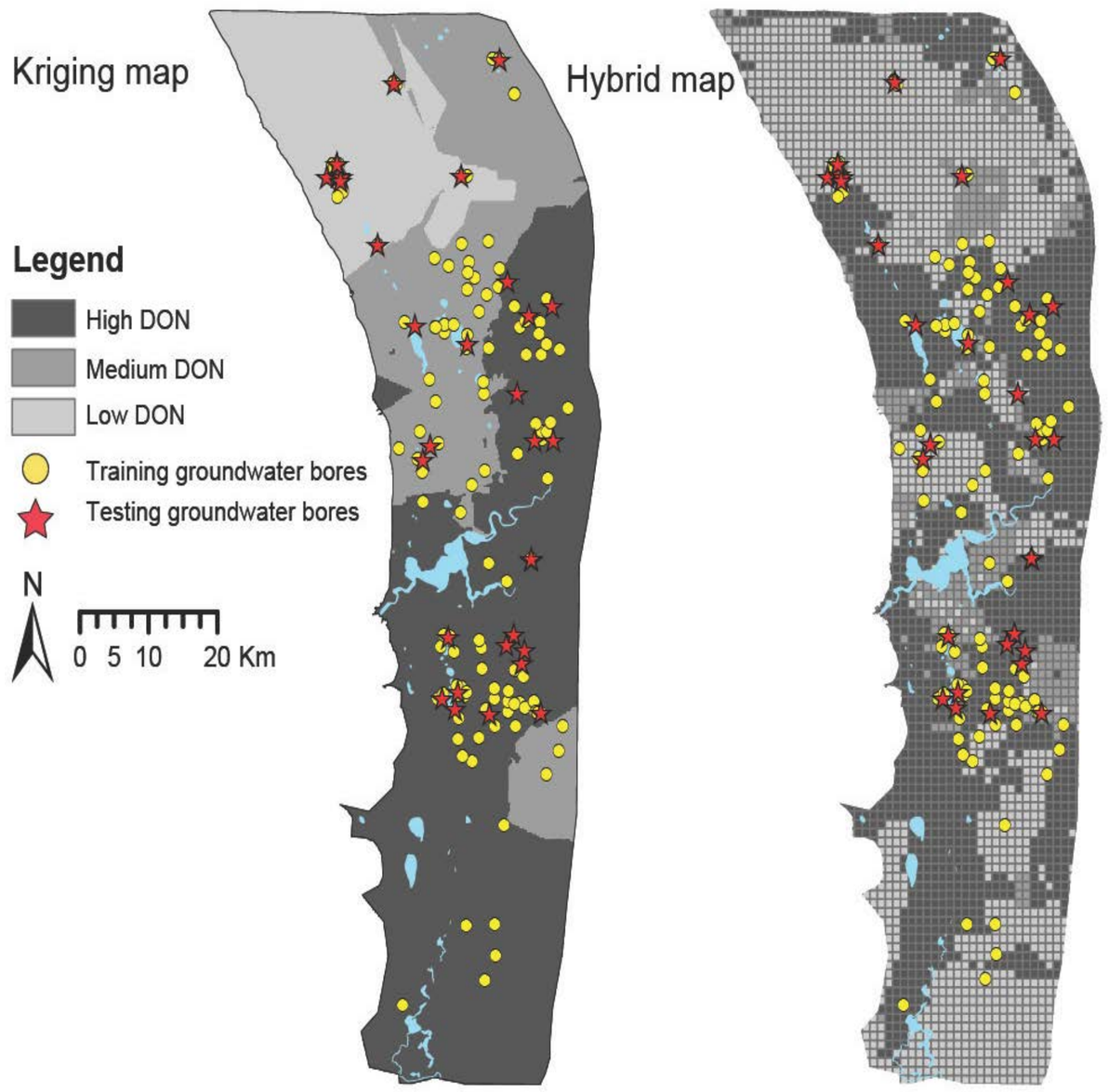

Fig 2. The groundwater DON maps of Kriging method (left) and the hybrid method (right)

Machine learning significantly improves predictive accuracy

The predictive accuracy increased from 64% to 83%

More detailed and accurate groundwater DON map was created

The map is useful for a better land use plan which takes note of vulnerable areas with high DON concentration

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