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Water quality is exciting even during a pandemic: students measure and interpret nitrate concentrations using the Nitrate App

Stefanie Lutz[1], Joachim Rozemeijer[2], Simon Buijs[2], and Rudie Ekkelenkamp[2]
[1]Utrecht University, Copernicus Institute of Sustainable Development, Utrecht, the Netherlands (s.r.lutz@uu.nl)
[2]Deltares, Utrecht, the Netherlands

The Covid-19 pandemic has severely affected possibilities for students to do field work and thereby train their team work skills. Under the uncertain conditions of the pandemic, teachers might be reluctant to plan field courses months ahead, and students and teachers might not feel comfortable or are simply not allowed to travel in larger groups. This calls for approaches that allow students to do field work in small groups in their own time and to integrate individual group results into a course-wide learning goal. In this contribution, we will share our experiences with the Nitrate App developed by Deltares, which enables students to do water quality measurements with minimal prior instructions and without supervision by teachers. The Nitrate App is a smartphone application that reads nitrate concentrations from test strips and stores them in a shared database. The app has been originally developed to support farmers in measuring nitrate concentrations and derive best management practices from these. While farmers make great use of this application, the Nitrate App has been increasingly employed for educational purposes. At the same time, educational use of this app can also feed back into water management, as this allows collecting nitrate concentration data at much finer spatial resolution than possible in regional water quality monitoring networks. The directly available measurement results allow for ad hoc decisions about measurement strategies for example to identify the source of high nitrate concentrations. We will illustrate recent examples of how the Nitrate App has been employed in field work assignments of Bachelor's and Master's geoscience courses as well as in elementary school education.