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Chicken Creek data portal: a web-based R-Shiny platform for terrestrial data repository

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Exploring hydrological and ecological processes plays a key role in understanding ecosystem development. In this respect, the constructed catchment, Chicken Creek (Hühnerwasser), has been established to promote fundamental and interdisciplinary scientific research. Since 2005, an on-going monitoring program has been established in this catchment to measure hydrological, biological, meteorological, and pedological parameters during the ecological development of the site. This comprehensive and multidisciplinary monitoring program has produced a large and diverse data set. Managing and exploring such a complex data set for research purposes can be a cumbersome task. As a consequence, we developed an online data portal https://www.b-tu.de/chicken-creek/apps/datenportal/ to efficiently handle the data from Chicken Creek catchment. The portal was constructed using R programming language, Shiny package, and the accompanying local Linux server. This platform allows for efficient data discovery, download, visualization, and analysis. Data visualizations are freely available, while data storage is limited to the authorized users. In comparison with the commonly used data base tools, R-Shiny offers several advantages. As an open source package, this platform allows for constructing a web data platform in an interactive way taking into account the complexity and diversity of the data. The flexibility of this routine enables to make an efficient user-demand data portal rather than relying on predetermined outputs. It also offers flexibility in data handling by using many different R packages, rendering versatile and extensive functionalities. R-Shiny is particularly powerful in terms of statistical analyses. Although the Chicken Creek online data portal is complete and available, new features, and extended capabilities are under active development. The Chicken Creek data portal provides a comprehensive and reliable database to give scientists a fast and easy access to all collected data. Consequently, R-Shiny offers a great potential for future development of the web-based data portals to efficiently handle scientific data collected at different scales.