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Measuring interdisciplinary research and education outcomes in the Vienna Doctoral Programme on Water Resource Systems

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The interdisciplinary postgraduate research and education programme - the Vienna Doctoral Programme on Water Resource Systems - was initiated in 2009. To date, 35 research students, three post-docs and ten faculty members have been engaged in the Programme, from ten research fields (aquatic microbiology, hydrology, hydroclimatology, hydro-geology, mathematical economics, photogrammetry, remote sensing, resource management, structural mechanics, and water quality). The Programme aims to develop research students with the capacity to work across the disciplines, to conduct cutting edge research and foster an international perspective. To do this, a variety of mechanisms are adopted that include research cluster groups, joint study sites, joint supervision, a basic study programme and a research semester abroad. The Programme offers a unique case study to explore if and how these mechanisms lead to research and education outcomes. Outcomes are grouped according to whether they are tangible (publications with co-authors from more than one research field, analysis of graduate profiles and career destinations) or non-tangible (interaction between researchers, networks and trust). A mixed methods approach that includes bibliometric analysis combined with interviews with students is applied. Bibliometric analysis shows that as the Programme has evolved the amount of multi-disciplinary work has increased (32% of the 203 full papers produced by the programme's researchers have authors from more than one research field). Network analysis to explore which research fields collaborate most frequently show that hydrology plays a significant role and has collaborated with seven of the ten research fields. Hydrology researchers seem to interact the most strongly with other research fields as they contribute understanding on water system processes. Network analysis to explore which individuals collaborate shows that much joint work takes place through the five research cluster groups (water resource management, land-surface processes, Hydrological Open Air Laboratory, water and health, modelling and risk). Student interviews highlight that trust between colleagues and supervisors, and the role of spaces for interaction (joint study sites, cluster group meetings, shared offices etc.) are important for joint work. Graduate analysis shows that students develop skills and confidence to work across disciplines through collaborating on their doctoral research. Working collaboratively during the doctorate appears to be strongly correlated with continuing to work in this way after graduation.