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A thousand miles in small steps. How to study human-induced changes on landscapes and vice versa

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Short-term manipulations do result in water balances and volumes on larger temporal and spatial scales and to different hydrological landscapes. Using those lumped volumes and balances cannot be used, however, to derive the many small-scale manipulations of water flows that built the lumped results: reading back the detail from the general is impossible. Hydrology and landscapes are the result of many individual activities – on their own or within entities like households and social groups – within physical landscape boundaries (hydraulic and hydrological). When simulating social action in modeling efforts, an issue of obvious importance is how to ensure that social action by human agents is well-represented in the analysis and the model. Generally, human decision-making in ABM-environments is either modeled on a yearly basis or lumped together as collective social structures. Both responses are problematic, as human decision making is more complex and organizations are the result of human agency and cannot be used as explanatory forces. A way out of the dilemma how to include human agency is to go to the largest societal and environmental clustering possible: society itself and climate, with time steps of years or decades. In this paper, the other way out is developed: to face human agency squarely, and direct the modeling approach to the human agency of individuals and couple this with the lowest appropriate hydrological level and time step. This approach is supported theoretically by the work of Bruno Latour, the French sociologist/philosopher.