Editorial

This first issue for the year 2001 collects together three papers and one technical note that together cover a wide range of activities in hydroinformatics. The first, on rainfall-runoff modelling using adaptive neuro-fuzzy systems, is introduced more for the technology employed than for the specific application. Rainfall-runoff modelling has long served as a testing ground for various techniques, even though its practical applications make up only a small part of applications of hydrology generally. Hydrology nowadays is much more concerned with problems of groundwater pollution, estimating the effects of groundwater mining, studying the impacts on runoff and erosion of changes in land use, investigating the impacts on food production and public health of irrigation and drainage projects and practices, and other such matters. Thus the interest here centres upon the more generic applications of the technology that is presented.

The subject of the second paper is nominally that of water resources management, but its treatment can be seen as a contribution of hydroinformatics to this subject area. Genetic algorithms are now very widely employed and the associated technology is becoming ever more refined and sophisticated. It is most laudable that this technology is finding its way into 'the world of the waters' in the way exemplified here.

These two papers are of a purely technical nature and no social or natural-environmental issues intrude. Studies of this kind are concerned with identifying certain 'preferable', or even 'optimal' or 'best' solution to largely predefined problems. These are problems that are predefined from further along the knowledge supply chain, largely independently of the persons concerned with identifying their 'best solutions'. The third paper, by way of contrast, follows hydroinformatics much more into its social and natural-environmental dimensions, where, although there may be certain 'preferences', these are not themselves decided by the hydroinformatician. And of course there can be no 'best' choice in this context, while it scarcely makes any sense at all to talk about 'the optimal solution'. Moreover, in the situations that arise in the third paper, the real-world problems cannot be predefined in most cases, but emerge from out of the operation of the hydroinformatics system itself.

The concluding technical note may serve as a reminder of just how tenuous and potentially unreliable even our scientific notions of 'optimum' and 'best' can be when their criteria are themselves pregiven in an uncritical way.

The papers presented here raise a number of issues that call for some further considerations. The first and most obvious of these considerations is that, through the compartmentalisation that is imposed or imposes itself along knowledge supply chains, hydroinformaticians may 'optimise' within their own compartment in ways that correspond only to the problem as pregiven by others outside that compartment. They may then quite miss the wider view that would provide them with opportunities to do so much better again. For example, in the case of the first paper, the input-output relations that are established contain a great deal of knowledge about the various delay times and diffusion effects that are inherent in the physical system—and which can be made explicit through the use of genetic algorithms. Since these are of no real consequence in the application described here, these features are not made explicit. However, an environmentalist studying the impacts of toxic spills might set other criteria for a study of this kind, giving rise to another approach. In the case of the second paper, the pregivenness is explicit and a change in requirements concerning durations and intensities of flows, such as might arise for health risk reduction in tropical areas, would not only change the results but also possibly some part of the methodology itself.

Beyond this looms another issue again, which is that all that is being done through such processes is to provide *knowledge* in suitably encapsulated forms, while what is often required in order to attain to a wider view is really something else again, which is *understanding*. The post-modern emphasis on the 'consumption of knowledge', rather than on 'knowing', has the consequence that knowledge becomes emphasised over understanding. Clearly, knowing something is by no means the same as understanding it, just as knowing a person is not the same as understanding that person. Knowledge only transforms into understanding when it becomes a subject of predication. It is then inherent in a postmodern condition of society that we who live within it must acquire the capacity to know more and more even as we thereby come to understand less and less. We can indeed now hypothesise a limit in which we shall finally know absolutely everything collectively, albeit only potentially, while actually understanding absolutely nothing, as individuals. In a society in which ever more 'knowledge islands' become products, and ever larger tracts of knowledge, such as those of word processing and algebraic manipulation, become commodities (or, in current 'business-speak', become 'commoditised') we can access and use, or 'consume', more and more knowledge at less and less cost without having to understand very much of it at all. In what is often called 'eclectic postmodernism', this leads to a situation where 'anything goes', whether in science, culture, religion, or anything else.

This situation must naturally be of concern to the hydroinformatician, who is also, his or herself, actively engaged in supporting and creating just this situation. The hydroinformatician cannot then be indifferent to the widening gap that is opening up between knowledge and understanding in his or her own field, just as in any number of others. The problem then poses itself correspondingly of how we, as hydroinformaticians can contribute to bridging this gap. Clearly this bridging must be attempted from both of the sides outlined above. From the one side we have to persuade 'the others', who set the problems that we are called upon to solve, to widen their horizons. This is to say that the hydroinformatician must bear in mind the way in which the constraints within which he or she operates are formed. These constraints are always set by the surrounding society so that they are ultimately of a social nature. This is to say that even when the hydroinformatician is working in what appears to be a purely technical context, he or she should bear the social aspects in mind. Hydroinformatics is ultimately always a *socio*technical endeavour, and this remains so even when it appears to be at its most technical. If hydroinformatics forgets this, then it risks becoming merely technocratic, with all manner of negative consequences.

Bridging from the other side, we have to provide the means to induce some kind of 'sufficient' understanding of our own productions into the productions themselves. Thus, for example, the tools that we produce should promote an understanding of the results that they produce and even provide some indication of the means employed to obtain these results. Their limitations should be made particularly clear in as many contexts as possible. In the case of the third paper in this issue and the concluding technical note, this means that we have to convey the limitations in the reliability of the knowledge that we are providing as a means of inducing understanding.

It should be clear—but it still has to be said, otherwise there is always someone who will insist on misunderstanding it!—that these remarks do not reflect any criticism of the papers presented in this issue, but are intended only to raise certain matters that arise naturally from these contributions.

On behalf of my fellow editors and myself, together with our IWAP production team, I wish all our contributors a happy, productive and prosperous 2001.

Michael B. Abbott
November 2000