



## (Geo)Ethics. Step 1: Preparedness.

Eduardo Marone

Center for Marine Studies of the Federal University of Paraná - Brazil - IOI-SWAO - [edmarone@ufpr.br](mailto:edmarone@ufpr.br)

Natural hazards have been defined in several ways in recent decades. Whatever your choice, it will be fine provided you consider that they are complex physical phenomena that expose a natural area to risk of loss of life, environmental degradation and property damages. In a time-line, one may divide the hazards, particularly those considered extremes, in a pre-event phase, the event itself and a post-event period. At this moment, I would like to promote an initial reflection by focusing in the geoethical behaviour scientists have to bear in mind accordingly to the particular characteristics of the pre-event phase, considering ethics as a way of systematizing, defending and recommending concepts of right and wrong conduct. In an accelerated world, where the pressure of the every day life gives us little room to exercise our mind to think in such apparent démodé issues as ethics, society, nature, responsibilities and duties, I would like to invite you to stop few minutes and reflect on the ethical implications of being a geoscientists dealing with natural hazards in the XXI century. The most dangerous hazards are those extreme events with a rapid onset (earthquakes, tsunamis, etc.). Thus far, science has not found effective ways to predict and reduce most natural hazards. If we are not capable to forecast or minimize the effect of an extreme event, geosciences, and scientists, are responsible of in deep risk assessments for areas that might be subject to natural hazards also contributing to preparedness of society. However, we have been working on that issues, but it seems we are not being as efficient as needed. On the risk analysis, which includes forecast models, we use to be too Cartesians, taking too much time in arriving to conclusions when a non clear cause-effect chain can be identified. It is our ethical duty to evaluate when to stop searching for causes when dealing with complex systems. The search for a specific cause for a given extreme natural event may be futile when dealing with a nonlinear system, with complex and unknown feedbacks mechanisms, because every link in the feedback loop is both cause and effect. Most of the risk analysis of natural hazards is linked to the effects of an extreme event, not to the causes, making almost useless for society and nature putting more effort trying to identify the causes than to analyse the consequences (effects). Regarding preparedness, also scientists need to improve their(our) behaviour. Preparedness implies the society as a whole, with its cultural, educational and resilience diversity. Scientists have to put the equivalent amount of energy in publishing their findings in high impact journals as well as in disseminating their discoveries for the society in a less jargonish (scientifish) format, because our primary ethical obligation is with society, neither with our peers nor our employers.