

# Science Communication with analysis by stakeholder themselves

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## 1. Introduction

Recently, it is strongly required that the research results obtained are opened into the society. Indeed, we devote some pages to write the social activity when we apply to some grants for our researches. We scientists and engineers (hereafter scientist refers both) have deep experiences how to research our scientific topics and to present the results to peer reviewers. We do have rare experiences to present the results to public. This leads, frequently, misunderstandings between scientists and public people. When things come to the worst about this misunderstandings, no one believes the statements from scientists. Such kind of tragedies have observed in BSE problem in U.K., and in the nuclear accident in Japan.

In general, detailed physical mechanisms of the urban climate investigation are the black boxes for public, and stakeholders. Therefore, careful introduction and explanation are necessary when the topics are related with some kinds of stakeholders. In addition, it is frequently observed that the statement of the assessment submitted by different associations conflicts each other, even though these statements are completely analyzed with the scientific processes. These conflicts lead confusions to stakeholders. One of the reasons to cause these conflicts is that the preconditions of these analysis and model are not clear. To overcome these conflicts and confusion, we introduce some tools with which the stakeholder can analyze the topics by themselves. The procedure will cause concerns to them, and they can deeply discuss the topics on the consensus conference using the data obtained from their own analysis. In this presentation, we introduce an outline of the tools. In addition, the importance of “bi-directionality” using the information and communication technology is also discussed.

## 2. Examples of some useful tools for stakeholders

Here we introduce some useful tools to overcome the stakeholder’s confusions.

### 2.1 Co-preparing a Hazard map

City office prepares the natural hazard maps in their area. The maps show, for example, what kind of risks are observed in the city, when heavy rain events occur. The data are based on the numerical simulation results from which the assessment companies, the natural or social scientists have considered in the present area. In many cases, these researchers are not the stakeholder. This kind of map is not reflect the reality that the stakeholders recognize in their daily life. This is because the maps are obtained from the general tools. To overcome this discrepancy, the stakeholders also take part in the map framing process. The project “e-community platform” at NIED (National Research Institute for Earth Science and Disaster Prevention <http://ecom-plat.jp>) is one of the solutions for such kinds of co-preparing hazard map projects. This project is a new integrated information infrastructure supporting a community. This kind of participation of stakeholders is very useful, because the citizen is more familiar with the city than outside scientists.

### 2.2 Numerical Simulation tools

Here, let’s review the public hearing. By using the assessment reports, the planner explains the environmental impacts to the stakeholders. They show some objectively evaluated values, then discuss the impacts. The experts like a scientist support and explain the meaning of the values. Here, it is premised that the experts should be honest. However, even though the presenter is honest, the stakeholder may doubt the results. This is because the precondition is not clear. What kind of precondition is considered in their assessment report? Is the precondition general or not? And also, the precondition is different in each person, therefore, the prepared preconditions are limited. All stakeholder cannot be supported. How overcome the situation? One of the answers is that the stakeholder becomes the assessment analyzer. Here we consider the case that the assessment data are created by numerical simulations.

The computational science is now the form of research. As reported in IPCC-AR5, the form of the numerical simulation for the global warming is recognized in society. At least, people who are highly concerned with the environmental problems know the importance of the results from the numerical simulations. The most concerned cases, they are so interested in using the numerical tools or applications by themselves. Of course the simulation are performed in the ultra-super computers like “Earth simulator”, therefore, the stakeholder could not be an

analyzer. However, a down-sizing application is now available by means of web application. For example in the field of space- / astro- physic simulations, the users can require their simulation in the web site (<http://ccmc.gsfc.nasa.gov>). The user sets the simulation parameters by clicking the page bottoms. After the calculations, the user will receive an e-mail then can see the results on the web pages. A similar web application to investigate the thermal environment condition is now planned in our institute. Partially interactive application is now opened for mainly educational purpose (see Figure 1).

### 3. Collaboration of scientists with society

In both the co-preparing the hazard map with the stakeholder and the solution of the public hearing, the common concept for the solution is that the stakeholder takes part in the data creation or data analyze processes. This collaboration is quite normal. The scientists frequently co-work with other colleges, then support each other. In the science communication, the same procedure could be used and this procedure seems to be normal. If you treat the “lack model” or “deficit model” in the science communication, it is un-balanced between the scientists and society or the stakeholder. Note that the lack model is “The model implies that communication should focus on improving the transfer of information from experts to non-experts. (After Wikipedia)”. How do you feel when the stakeholders use the “lack model” to you because you are non-experts of society? They also have important information about their society, therefore you should collaborate with them as colleges.

### 4. When you open the data

As noted in section 2, the preconditions are different in each stakeholder. Therefore, it is also required the analysis tools are distributed. For example, the thermal environment result is shown in a snap-shot viewgraph as shown in Figure 2, there are at least two requirements are observed. One is that “This is snap shot. How about the other day, time, and weather?” Another is that “How about the behind of the tall building?”

For these requirements, we have developed a useful application to represent the numerical simulation results (see <http://www.jamstec.go.jp/ceist/extrawing>). By using this application, you can easily transform from numerical binary data into the KML-format data, then you can see the colorful numerical simulation results based on the geo-coordinate system on the google-earth application. The user can easily change the view point, the time sequence of the results.



Fig. 1. An educational simulation web site in JAMSTEC Japanese site. The thermal environment and the wind profiles of some pseudo towns (industrial, country-side, crowded, residential areas) are investigated and the results are plotted. The user can see the differences.

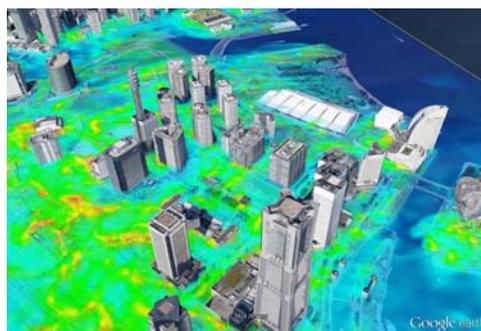


Fig. 2. A sample result from the heat environment simulation in an urban area. The color represents the relative air temperature from green to red. The user easily change the view point, the time sequence of the results using the google-earth application interface.