PLURISK (SD/RI/01A)

Forecasting and management of extreme rainfall induced risks in the urban environment

1st FOLLOW-UP COMMITTEE MEETING

Brussels, 12 October 2012

Minutes

LOCATION

BelSPO Room C, Louizalaan 231 Avenue Louise, 1050 Brussel | Bruxelles

AIM

The aim of the meeting was to introduce the PLURISK project, to discuss with potential end users its objectives and work plan, and to select the case studies.

AGENDA

The agenda was as follows:

- 13:00 Welcome
- 13:30 Introduction by Christine Mathieu (BelSPO)
- 13:45 Overview of the PLURISK project (Patrick Willems, KU Leuven - Hydraulics)
- 14:00 Presentation and discussion on objectives and methodologies of:
    - WP1: Nowcasting of fine-scale extreme rainfall (Laurent Delobbe, KMI/IRM)
    - WP2: Two-dimensional fine-scale modelling, mapping and nowcasting of inundations in urban areas (Patrick Willems, KU Leuven icw Aquafin & Imperial College London)
    - WP3: Socio-economic risk quantification for (historic) urban areas (Lieven De Smet, HIVA & Koen Van Balen, R. Lemaire International Center for Conservation / Unesco Chair on Preventive Conservation, monitoring and maintenance of monuments and sites)
    - WP4: Risk communication and warnings for flood risks, extreme rainfall and lightning (Lieven De Smet, HIVA)
    - WP5: Risk reduction by both prevention/management (blue – green urban water infrastructures) and real-time control actions (Justine Marechal, Grégory Mahy, ULg Gembloux Agro-Bio Tech)
- 15:30 Presentation/discussion on case-studies:
    - Leuven case / Interreg RainGain project (Johan Van Assel, Aquafin)
    - Liège case (Jean-Pierre Silan, Roland De Schryver, AIDE)
    - Gent case (Ilse Pauwelyn, TMVW)
- 16:30 – 17:00 Closure

PARTICIPANTS

BelSPO project officer: Christine Mathieu

Project partners:
Patrick Willems, Laurens Cas Decloedt, Charlotte Buyse (KU Leuven, Hydraulics)
Laurent Delobbe, Maarten Reyniers, Kristof Smolders (RMI)
Lieven De Smet (HIVA)
Koen Van Balen (KU Leuven, Dept. Civil Engineering)
Gregory Mahy, Justine Marechal (ULg Gembloux Agro-Bio Tech)

End users:
Johan Van Assel (Aquafin)
Jean-Pierre Silan, Roland De Schryver (AIDE)
Ilse Pauwelyn, Sofie Verdonk, Renaat Coene, Marjan Dewispelaere (TMVW & Stad Gent)
Guy Verbuyst, AquaFlanders
Yves Goossens (Provincie Antwerpen, Dienst Waterbeleid)
Michaël Antoine (Bruxelles Environnement - IBGE / Leefmilieu Brussel – BIM)

COMMENTS

During the introduction presentation, C.Mathieu of BelSPO explained that the PLURISK project proposal was well evaluated by the reviewers. Based on the comments received from these reviewers, BelSPO wants the project consortium to set up a strong interfacing with the different work packages and with the project end users. Given that the reviewers considered the project objectives of WP1 and WP2 as very "ambitious", BelSPO asks the project coordinator to carefully follow up the project timing. Follow-up Committee meetings can be organized once per year. This can be done by traditional meetings, but can also be combined with workshops, e.g. combined with a workshop of the Interreg project RainGain.

G.Verbuyst requested to distribute the presentations prior to the meeting.

The following agreements were made during the meeting:

- As part of the socio-economical risk assessment, the ecological consequences of the urban floods will also be taken into account. This was overlooked in the project proposal, but the PLURISK partners agreed already during their project kick-off meeting at Leuven in April 2012 to consider this type of consequences as well. It will be integrated with the activities of WP5. The activities of WP5 therefore will be restructured in the following key research steps: Identification of potential ecosystem services based on a typology of green/blue infrastructures; localisation of green infrastructures and associated ecosystem services in the three case studies; assessment of flood risks on green areas and their functions, applied to the three case studies; identification of adaptation strategies (e.g. new green areas, management of existing green areas, ecotechnologies).
- The cities of Leuven and Gent will be case-studies in the project.
- For the case studies of Gent and Liège, meetings will be organized between the project coordinator and the local urban water managers and engineers to further discuss the case study demands and offers, and to discuss practical issues. Mr. Silan and Mr. Roland De Schryver of AIDE will contact other colleagues, who might be better placed to follow up this project.
- One of the subregions of the Brussels Capital region could also be a potential case study. Mr. Antoine will contact some colleagues to further explore this option and will keep contact with the PLURISK coordinator on this issue.

- J. Van Assel explained that an agreement will be made with KU Leuven on the exchange of data within the scope of this project. The City of Leuven will be contacted reg. their involvement in the project.
- P.Willems explained that the Belgian cities that will act as case study in the PLURISK project should:
    - have a sewer system model available, and make it available to the project;
    - Idem for the high resolution DTM; for the Flanders region, the Agentschap AGIV can be contacted to check the availability of a high resolution (e.g. 1m grid size) DTM;
    - have recent rain gauge data available (which might include the rain gauges of the monitoring networks of RMI and water authorities, e.g. VMM and HIC);
    - provide data on historical inundations (area, streets, approx. inundation depths, …);
    - provide information on the cultural heritage (historical monuments, sites) in the city;
    - provide info on the current urban flood management approach; provide other expertise by local urban water managers of use for the different research tasks of the project; e.g. interact with the project partners on the usefulness of urban flood warnings, the required lead time of the nowcasts, on how uncertainty can be best handled in practice, etc;
    - follow-up of PLURISK results and provide feedback.
- For the case of Leuven, Aquafin installed recently four additional rain gauges, as part of the RainGain project. They also have an X-band radar installed since 2008. This new radar technology is very promising and can provide useful additional rainfall data at fine spatial and temporal resolution. The other cities could consider the option to do the same: installing additional rain gauges and/or an X-band radar.
- The list of names for the Follow-up Committee will be finalized the next weeks. J. Assel will contact the City of Leuven, and ask for names. The same will be done for TMVW and the City of Gent. K. Van Balen will contact S.Vanblaere, Director-General of the Agentschap ruimte en onroerend erfgoed to nominate a person of the Agentschap who is ready to act as a member of the PLURISK Follow-up Committee. The meeting agreed that it would be good to have a person of the Belgian Federation of Insurance Companies involved in the Follow-up Committee. Christine Mathieu of BelSPO will propose a name.
- After the list of Follow-up Committee members is final, the PLURISK initial reports by the different partners will be finalized. The different partners can already prepare these reports (without the Follow-up Committee member list) and send these asap to the PLURISK coordinator. He will collect and finalize these reports the next weeks, and send these to BelSPO.
- The PLURISK website is available on: http://www.kuleuven.be/hydr/plurisk. All comments/suggestions/input are very welcome; they can be sent to the PLURISK coordinator.
- The presentations at this meeting will be uploaded soon on the project website.
- P.Willems will present the PLURISK project during the kick-off of new BelSPO SSD projects on 22 October 2012. It would be good if at least one person per project partner would be present at this kick-off (to support answering WP specific questions); e.g. the researchers on the project.

This leads to the following **action list**:

- Project partners RMI & HIVA: Complete and send initial reports (without completed list of Follow-up Committee members) to the project coordinator (asap)
- RMI: Send pdf of their presentation at the 1st Follow-up Committee meeting to project coordinator for uploading on the website (asap); idem other partners, Aquafin and AIDE if they want to change slides; idem TMVW if they agree to have their slides uploaded
- K.Van Balen: contact Agentschap ruimte en onroerend erfgoed reg. their interest to participate in the Follow-up Committee + nomination of name(s) (mid of November)
- Aquafin:
    - Prepare agreement with KU Leuven on exchange of data for Leuven case (including X-band radar data) (next months)
    - Contact City of Leuven reg. PLURISK project and their interest to participate in the Follow-up Committee + nomination of name(s) (mid of November)
- BelSPO: Propose contact person of Belgian Federation of Insurance Companies to be involved in the Follow-up Committee (end of October); to be contacted afterwards by the project coordinator (mid of November)
- IBGE/BIM: Contact some colleagues to further explore the option to consider the Brussels Capital region as PLURISK case-study (next months)
- AIDE: Contact colleagues dealing with the sewer management and of the city of Liège to further explore the option to consider the city of Liège (or part of it) as PLURISK case-study (next months)
- By the project coordinator KU Leuven – Hydraulics:
    - Upload pdf's of presentations at the 1st Follow-up Committee meeting on the PLURISK website (asap)
    - Provide the French translation of the PLURISK project summary, as recently provided by Justine Marechal, on the PLURISK website (asap)
    - Prepare the PPT presentation for the BelSPO kick-off (by 16 October); presentation on 22 October
    - Finalize the Follow-up Committee list based on the inputs received (mid of November)
    - Collect the initial reports of all project partners and finalize with final list of Follow-up Committee members (mid of November)
    - Organize meeting with IRM to discuss the detailed work plan and the interfacing between WP1 & WP2 (similar meetings as recently already held with HIVA and ULg Gembloux Agro-Bio Tech) (mid of November)
    - Organize meeting with TMVW & City of Gent to discuss in a more detailed way the participation of the case Gent (next months)
    - Idem for case Liège (next months)

PLURISK (SD/RI/01A)

Forecasting and management of extreme rainfall induced risks in the urban environment

2nd FOLLOW-UP COMMITTEE MEETING

Brussels, 12 December 2013

Minutes

LOCATION

BelSPO Room C, Louizalaan 231 Avenue Louise, 1050 Brussel | Bruxelles

AIM

The aim of the meeting was to present an update of the results obtained by the different Work Packages (WPs) of the PLURISK project, and to discuss and select the 3th case study for the project (in the Brussels Capital Region).

AGENDA

The agenda was as follows:

- 1 pm – 3 pm: Update on the progress in the different WPs, including the results for Leuven & Gent case studies (15 min presentation each + questions)
    - General introduction (Patrick Willems, KU Leuven)
    - WP1: rainfall nowcasting (Loris Foresti, RMI)
    - WP1: X-band radar-based fine-scale rainfall estimation (Laurens Cas Decloedt, KU Leuven)
    - WP1: stochastic fine-scale rainfall modelling (Lipen Wang, KU Leuven)
    - WP2: 2D sewer inundation modeling (Damian Murla Tuyls , KU Leuven)
    - WP3: socio-economic impact analysis urban sewer floods (Tom Creten, HIVA)
    - WP3: flood damage to cultural heritage (Ona Vileikis Tamayo, KU Leuven)
    - WP5: biodiversity and landscape analysis (Justine Marechal, Gembloux Agro-Bio Tech)
- 3 pm – 4 pm: selection of the 3th case study in Brussels
    - Presentation of potential study areas: Woluwe valley & Flagey (Michaël Antoine, IBGE/BIM)
    - Discussion

PARTICIPANTS

BelSPO project officer: Christine Mathieu

End users:
Johan Van Assel (Aquafin)
Ilse Pauwelyn, Renaat Coene (Water-Link & Stad Gent)
Michaël Antoine (Bruxelles Environnement - IBGE / Leefmilieu Brussel – BIM)
Azdine Laanait (Vivaqua)

Project partners:
Maarten Reyniers, Loris Foresti (RMI)
Luc Van Ootegem, Tom Creten (HIVA)
Koen Van Balen, Ona Vileikis Tamayo (KU Leuven, Dept. Civil Engineering)
Gregory Mahy, Jan Bogaert, Justine Marechal (ULg Gembloux Agro-Bio Tech)
Patrick Willems, Laurens Cas Decloedt, Damian Murla Tuyls, Lipen Wang (KU Leuven, Hydraulics)

Excused.
Laurent Delobbe (RMI)

COMMENTS

During the introduction of the meeting, C.Mathieu of BelSPO explained how the mid-term project evaluation will be done.

After the presentation of the interim results for each WP, the following questions and suggestions were formulated by the participants to the meeting:

- On the WP1 presentation "rainfall nowcasting" (Loris Foresti, RMI):
  - Johan Van Assel asks whether the X-band radar data of Leuven will be used as well for the rainfall nowcasting. This is indeed planned; but the nowcasting system first will be developed and tested based on the C-band radar data.
  - Lipen Wang asks clarification on whether Numerical Weather Prediction will be integrated in the rainfall nowcasting system.
  - Koen Van Balen wonders how small scale features such as topography or topographical changes will affect the nowcasting results. There also might be influence of the heat island effect above cities. Luc Van Ootegem wonders whether bias correction can be applied for that.
  - Jan Bogaert wonders whether it would be useful to consider scaling issues for verifying the accuracy of precipitation nowcasts.

- On the WP1 presentation "X-band radar-based fine-scale rainfall estimation" (Laurens Cas Decloedt, KU Leuven):
  - Johan Van Assel wonders whether the area covered by the two new planned X-band radars by the Japanese company Furuno both will cover the study region. This is indeed the plan, such that intercomparison can be made of both radars (which are of a different type).

- On the WP1 presentation "stochastic fine-scale rainfall modelling" (Lipen Wang, KU Leuven):
  - Maarten Reyniers asks whether hail is being considered in the singularity analysis.
  - Loris Foresti asks about the consideration and magnitude of the uncertainties involved in the modelling.

- On the WP2 presentation "2D sewer inundation modelling" (Damian Murla Tuyls , KU Leuven):
  - Johan Van Assel asks whether the AOFD tool in support of the 1D schematisation of surface runoff in the drainage area has been implemented already. First tests are being made, which are promising, but some remaining problems need to be solved. This will be done in cooperation with researchers from Imperial College London.
  - Johan Van Assel asks with which method the shown 2D inundation maps have been produced. He moreover asks for clarification on the DTM: based on point observations or grid data?
  - Michael Antoine asks whether the tools that will be developed for the 2D sewer inundation modelling will be fully based on the InfoWorks-CS software, or whether it will be partly based on external software. He clarified that it would be useful for end users to have all parts of the tool implemented in the same software.

- On the WP3 presentation "socio-economic impact analysis urban sewer floods" (Tom Creten, HIVA)
  - Damian asks clarification on the damage costs considered. These are costs claimed by the people.
  - Michael Antoine proposed a cost-benefit analysis, including the costs of measures such as pumps.
  - Johan Van Assel asks whether river floods have been taken out for the database of historical floods considered. And maybe hail and wind disasters are included as well?
  - Gregory Mahy explains that a PCA analysis might be useful.

- Maarten Reyniers wonders whether there are temporal trends that need to be taken into account
- Jan Bogaert suggests to account for the influence of completeness. There is also a Disaster Fund change after 2008. The meeting also wonders whether Assuralia or the insurance industry can provide us with additional data on sewer flood consequences.

- On the WP3 presentation "flood damage to cultural heritage" (Ona Vileikis Tamayo, KU Leuven):
  - Gregory Mahy suggests to consider cultural issues as well, similar to ecological services.
  - Ona is asking the participants whether we have cultural heritage that was affected by historical flooding in the three study regions.

- On the WP5 presentation "biodiversity and landscape analysis" (Justine Marechal, Gembloux Agro-Bio Tech)
  - The meeting asks whether the analysis will be done in a quantitative or rather qualitative way. It is explained that the impacts on the sewer flood risk will be quantified by means of the sewer models of WP2. WP5 also will quantify the ecological impacts of sewer floods to be integrated with the quantification of sewer flood consequences by WP3. Next to the role that landscape elements or different types of open spaces in a city can play in storm water management, by means of retention and infiltration, also interconnectivity to the water (sewer, river) system is an important element to be taken into account. Links with urban design or other roles that green in a city can play are important here as well.
  - Michael Antoine stresses on the importance to consider also the classical management strategies such as storm water retention basins.

- On the selection of the 3th case study in Brussels
  - Michael Antoine (IBGE/BIM) gives a presentation on the proposed Woluwe case.
  - Azdine Laanait (Vivaqua) explains that they have a sewer model available for that region. Patrick Willems explains the importance to have access to this model, because there it is not feasible, neither efficient to develop this model again. He clarifies that there is no problem to have a user agreement signed on the use of the model. Christine Mathieu explains that Belspo has standard contracts available for such agreements, and can provide support here. Azdine Laanait suggests that the PLURISK coordinator will write a letter to ir. Olivier Broers of Vivaqua on that issue.
  - The meeting agreed on the interesting parts of the Woluwe region, in terms of sewer floods and interactions with the river system. Michael Antoine explains that IBGE/BIM does not have responsibilities in terms of the sewer system management, but is responsible for the management of the rivers; the sewer systems have an important contribution to and interaction with the sewer system.
  - The meeting finally agreed that part of the Woluwe area will be selected as third case study for the PLURISK project, but that the final decision on this depends on the negotiation with Vivaqua about the use of the sewer system model.

PLURISK (SD/RI/01A)

Forecasting and management of extreme rainfall induced risks in the urban environment

3th FOLLOW-UP COMMITTEE MEETING

Brussels, 4 March 2014

Minutes

LOCATION

BelSPO Room 351, Louizalaan 231 Avenue Louise, 1050 Brussel | Bruxelles

AIM

The aim of the meeting was to present an update of the results obtained by the different Work Packages (WPs) of the PLURISK project, and give feedback to the Follow-up Committee members on the outcome of the mid-term evaluation of the project by international experts.

AGENDA

The agenda was as follows:

- Welcome, and feedback on the outcome of the mid-term evaluation of the project (Patrick Willems, KU Leuven)
- Update on PLURISK WP1: part rainfall nowcasting (Maarten Reyniers replacing Loris Foresti, RMI)
- Update on PLURISK WP1: part rain gauge – radar merging, temporal interpolation and rain storm tracking (Lipen Wang & Carlos Munoz, KU Leuven)
- Update on PLURISK WP2: 2D sewer inundation modeling (Damian Murla , KU Leuven)
- Update on PLURISK WP3: socio-economic impact analysis urban sewer floods (Kristine Van Herck & Luc Van Ootegem, HIVA)
- Update on PLURISK WP5: biodiversity and landscape analysis (Justine Marechal, Gembloux Agro-Bio Tech)
- Comments/suggestions from the FCM members (all)

PARTICIPANTS

BelSPO project officer: Christine Mathieu

End users:
Johan Van Assel (Aquafin)
Marjan Dewispelaere (Farys)
Michaël Antoine (Bruxelles Environnement - IBGE / Leefmilieu Brussel – BIM)
Bernard Desmet (Assuralia)

Project partners:
Maarten Reyniers (RMI)
Luc Van Ootegem, Kristine Van Herck (HIVA)
Koen Van Balen (KU Leuven, Dept. Civil Engineering)
Gregory Mahy, Justine Marechal (ULg Gembloux Agro-Bio Tech)
Patrick Willems, Damian Murla Tuyls, Lipen Wang (KU Leuven, Hydraulics)

Excused:
Renaat Coene (Stad Gent)
Sofie Sonck (Farys)
Jo Van Valckenborgh (AGIV)
Loris Foresti, Laurent Delobbe (RMI)
Jan Bogaert (ULg Gembloux Agro-Bio Tech)

COMMENTS

During the introduction of the meeting, the PLURISK coordinator P.Willems gave feedback on the positive midterm evaluation the project received from the panel of international experts. The recommendations formulated by these experts were also presented.

After the presentation of the interim results for each WP, the following questions and suggestions were formulated by the participants to the meeting:

- On the WP1 presentation, part "rainfall nowcasting" (Loris Foresti, RMI):
    - Johan Van Assel asks about the spatial resolution of the nowcasts and why it is coarser than the available radar data (2 km instead of 500 m).
    - Johan Van Assel asks whether the validation is done based on the radar data only, or whether also rain gauge data have been considered
    - The meeting asks about the meaning of "climatology" that is considered as reference to validate the nowcasts.

- On the WP1 presentation, part "rain gauge – radar merging, temporal interpolation and rain storm tracking" (Lipen Wang & Carlos Munoz, KU Leuven):
    - Johan Van Assel asks whether the potential time shift between the radar data and the 1-minute rain gauge data has been taken into account in the temporal interpolation method

- On the WP2 presentation "2D sewer inundation modelling" (Damian Murla Tuyls , KU Leuven):
    - Michaël Antoine asks whether the sewer models applied were existing, and which software has been applied; whether software changes had to be made/ have been made
    - Johan Van Assel asks about the simulation time, whether it is lower than real time
    - Kristine Van Herck asks how general the approach is; how easy it can be applied in other case studies
    - Gregory Mahy and Justine Marechal ask whether rural areas and landscape or green-blue water integration scenarios can be simulated in the software
    - Koen Van Balen reports on the existence of xml-based GIS data formats available for urban areas, which might help in the DEM and other GIS data processing

- On the WP3 presentation "socio-economic impact analysis urban sewer floods" (part Kristine Van Herck, HIVA)
    - Johan Van Assel asks whether the floods considered in the survey and statistical analysis were only sewer floods or whether other flood types were considered as well
    - Damian Murla Tuyls asks whether the flood duration has been taken into account as well
    - Johan Van Assel asks about the need to consider public damages as well, next to the private property damages

- On the WP3 presentation "socio-economic impact analysis urban sewer floods" (part Luc Van Ootegem, HIVA)
    - Patrick Willems asks how the risk quantification can be approaches: do we need to keep the financial and non-financial (social) separate in our project (separate

risk maps) or would there a way to integrate both
    - Michaël Antoine asks whether the (self-coping) capabilities of people aren't higher in urban zones with higher flood risk
    - Gregory Mahy states that some people consider /accept that floods as part of their life. He moreover indicated that information on the status of people in the high flood risk zones would be very useful for WP5 of the project
    - Lipen Wang warns to be careful with the comparison made between the dependency on flood depth expressed in cm and the flood duration in hours. Results clearly would depend on the unit considered (cm vs hour; e.g. why not minutes instead of hour)
    - Michaël Antoine suggests that next to the flood depth also the flood duration might be very important for people

- On the WP5 presentation "biodiversity and landscape analysis" (Justine Marechal, Gembloux Agro-Bio Tech)
    - Johan Van Assel asks clarification on how the green areas density was calculated, because it appears unexpected that the city center has a higher green areas density than the suburbs
    - Gregory Mahy states that the adaptation strategies to be designed by WP5 need to be checked with the end users
    - Damian Murla Tuyls asks where the size of the circle buffer is based on; he moreover suggests that next to the amount of green areas also the connectivity to for instance the sewer network is important
    - Michaël Antoine advices to consider only storm water storage in green spaces, no waste water
    - Johan Van Assel states that it is very difficult to implement in the sewer model the very small spatial elements
    - Gregory Mahy suggests to identify what is feasible in the remaining phase of the project.