Meeting KEM studies and KNMI on issues with records from B- and G-stations in the Gorningen field, 13th February 2019

Attendants

Name	Affiliation	E-mail	Attendance
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Items discussed

- The issues with records from B-stations and from G-stations were presented by KEM04 and discussed by all (see slides from KEM04 sent earlier). Both the KEM04 and the KEM02 team recently discovered the issues with the records from the G-stations, independent and in parallel.
- According to KNMI, incompatibility between hardware and software resulted in PGA and PGV measurements of G-sensors (installed since 2014) which had to be corrected by a factor 2 to 4 (increase). KNMI looked into the records and tested instruments on shaketable, found the cause. They established the solution and corrected the data in December 2018. The corrected data have been put on the website for download. The orientations of sensors in the boreholes have also been determined recently and are now reported in the header of the files. (see slides from KNMI sent earlier).
- KEM04-team will download the corrected records from KNMI website and re-do some analyses for KEM04. Can initially continue without B-station records. But 3D model calibration requires best possible data (and GMM V6). Would like to have an independent review of the findings so far. Can offer shake table tests of instruments (Hanze University, Ihsan Bal) and can look into installation of B-stations, using information to be delivered by KNMI. The peak in the vertical component of the B stations maybe an effect of the building or of the structure in general.
- KEM02-team can continue with the corrected G-station data from KNMI, while the B-station data is less critical. Can offer the independent review by Andrei Metrikine (TUDelft).
- Both KEM02 and KEM04 teams need clarity on changes in parameters of GMM V6 compared to GMM V5. GMM V6 is under development, apparently to be completed by end of March, but NAM still using V5 for next HRA.
- KEM02 (and KEM04) would like to discuss the (changes in) GMM V5 / V6 with Deltares , to better understand which data and measurements were used for instance.
- Everyone in the meeting agrees to have a few joint meetings on the issues in the coming months
- KNMI would like to have a better insight into who is using the datasets from KNMI, not clear now. Not sure how KNMI will communicate on the record issues and corrections.
- Impact of correction of G-station records
    - on Groningen Hazard & Risk may be low (because dominated by larger amplitude events) while the uncertainties would decrease.
    - Implications for the amplification functions probably larger because the model by Deltares may be based on the data at G stations for calibration.
    - Implications for the GMM V5 model in terms of attenuation with distance.
    - Possibly implications for the PGV model since this one based on low-magnitudes Empirical PGV maps based primarily on B-station data.
    - These effects can be estimated after calculating the effects using GMM V6.
- Data requests to KNMI were discussed briefly. In future, please include both and in e-mails and phone calls. @knmi.nl, @knmi.nl

Outside scope of KEM02 / KEM04 but very relevant (and briefly discussed)

- How to estimate and communicate the issues, solutions and implications beyond KEM studies, e.g. in Groningen HRA, etc.
- How does NAM deal with this?
- Which other studies have used the records with issues?

Action Points

- Send around slides of meeting 13th February 2019 ( ) *(done)*
- Set up two meetings of people involved in KEM02 en KEM04, together with KNMI, EZK, SODM to discuss progress on the discussed issues ( ) *(doodle will be sent out)*
- Deliver information on the installation of B-stations (in buildings) and G-stations (in free field) (KNMI)
- Deliver an official statement on the correctness of the data as it is available on the KNMI website (KNMI)
- Prepare a document describing the impact of the issues of KNMI data on the KEM04 project, the expected delays for the different RQs and the impact in terms of budget. ( )
- Following items to be discussed with EZK (to contact EZK to initiate this)
  - When will GMM V6 be finalized and be available to KEM02 and KEM04 team? Can they have a meeting on GMM V6 with the Deltares team?
  - Proposal to have an independent review of findings KEM04 and KNMI by (TUDelft), as part of KEM02 project
  - Proposal to have shaketable tests of instruments by Hanze University and an investigation into B-station installation by Fugro-team, as part of KEM04 project
  - Rescoping of KEM02 and KEM04 (scope, timeline, budget) - after clearity on availability of GMM V6