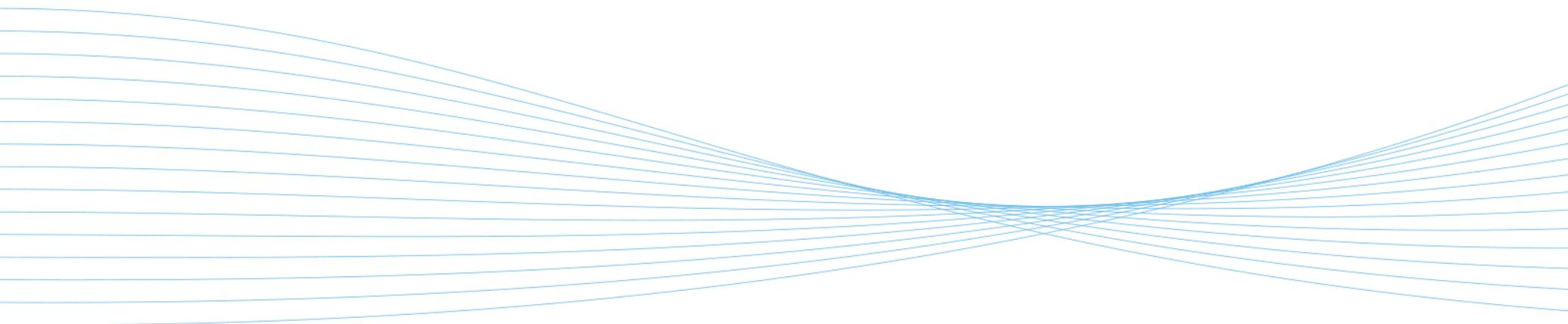




FINNISH METEOROLOGICAL INSTITUTE

# **Smartmet II Weather Warning System Mikko Visa EGOWS/MOS 2015**





# General

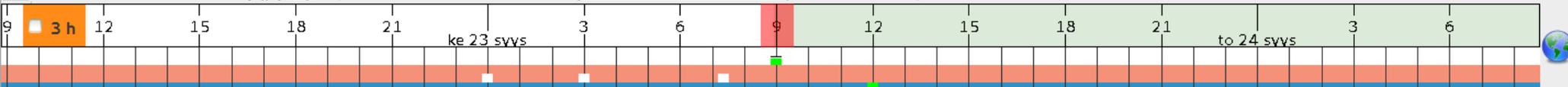
- Meteorological workstation for creating analysis, forecasts and now also warnings for end production.
- Implemented with Java programming language.
- Enables displaying observations, radar & satellite images, and model data on top of different map layers as background data for the meteorologist.
- As an output of users work Smartmet II returns GML documents which support OGC standard. These are then utilized in production of several different products.
- Smartmet II takes advantage of Java webstart. The user does not need to install the software on his/her computer. To use it the user needs only internet access and Java Runtime Environment (Java7 currently)



# Basic Ideas

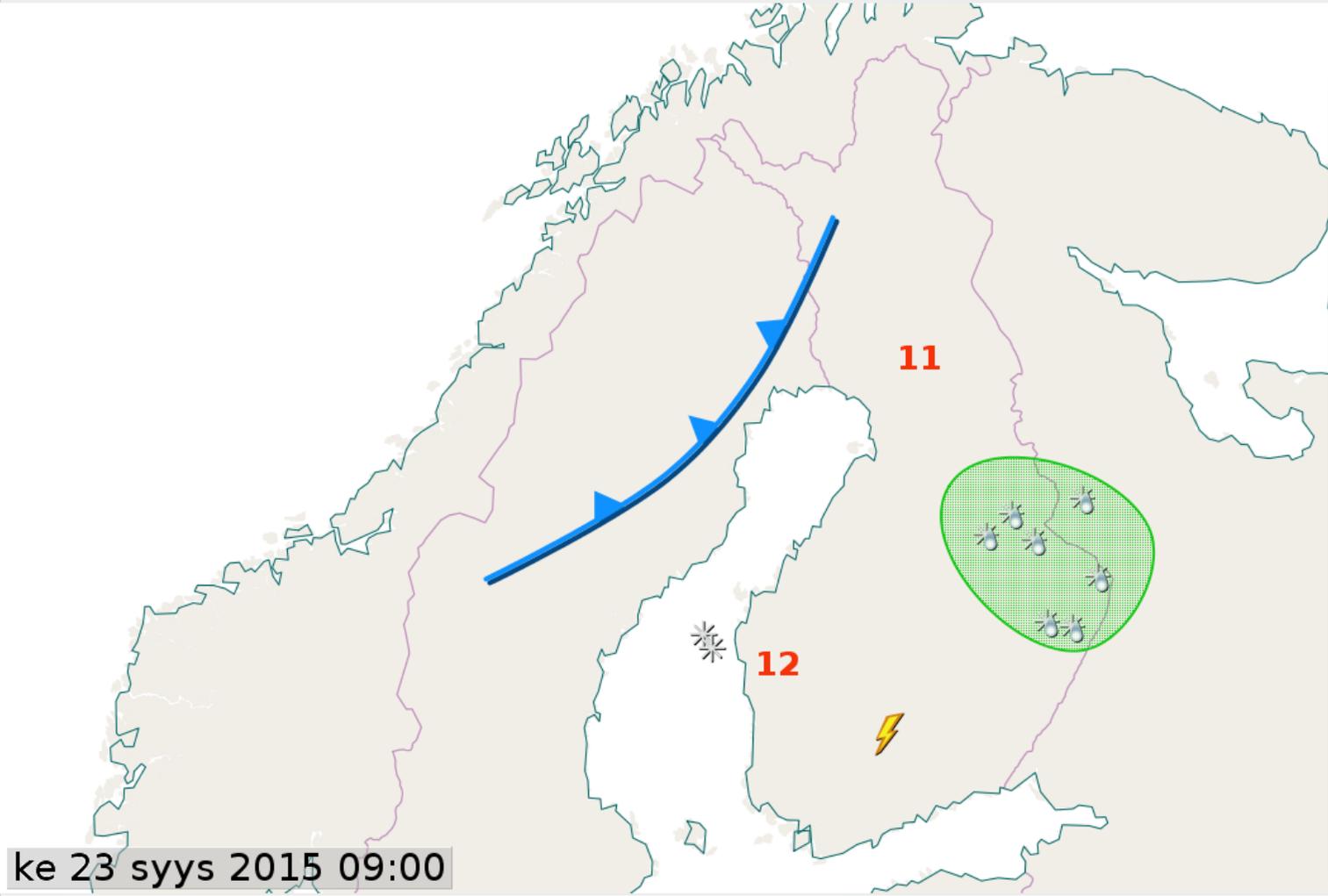
- Plugin-based architecture
- The framework takes care of time and area selection
- Data layers, selected by the user, are displayed on top of each other on the map panel
- All requested information is inspected in the same projection so that comparison of the data is easy
- Meteorologists make their analysis and interpretations on top of the data layers
- Launch + loading and saving the data is network-based

- Saatava tieto
- Valitut tasot
  - observation
  - radar
  - satellite
  - model
  - + HirlamRCR ( 230 )
  - + Ecmwf ( 240 )
  - + Ecmwf3vrk ( 241 )
  - + Gfs ( 54 )
  - + Arome ( 199 )
  - + KapData ( 2001 )
  - + Laps ( 109 )
  - + PedestrianNOIC ( 116 )
  - + PedestrianWIC ( 117 )
  - + Topo ( 4001 )
  - map
  - Tasot
  - Gridiviivat
  - Tiet
  - Rajaviiva
  - Joet
  - Järvet
  - Rantaviiva
  - Maat
  - Kmdem
  - Rantaviiva (karkea)
  - Maa (karkea)
  - Kaupungit
  - Suurkaupungit
  - Maakunnat (raja)
  - Maakunnat (alue)
  - Lapin kunnat (raja)
  - Lapin kunnat (alue)
  - Kunnat (raja)
  - Kunnat (alue)
  - Merialueiden rajat
  - Merien lyhenteet



Valitut tasot

Saatava tieto



ke 23 syys 2015 09:00

### Rintamapiirto komponenttien valinta

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#### Rintama viivamaiset

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#### Rintama aluemaiset

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Rintamapiirto

Sadepilvet - Pilvet

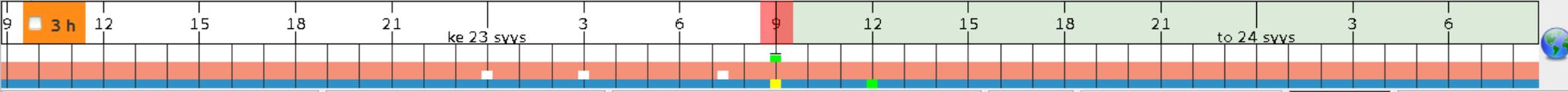
Säämerkit

C° Lämpötilat

Tuulet

Muut merkit

Varoitusmerkit





# Backends



# Data sources

- MetOcean Data Server Brainstorm
  - Q3 plugin (Model data, SYNOP observations)
  - TimeSeries plugin (Used for best guesses for forest fire and wave height)
- MapServer (WMS)
  - Background maps
  - Radar images
  - Satellite images



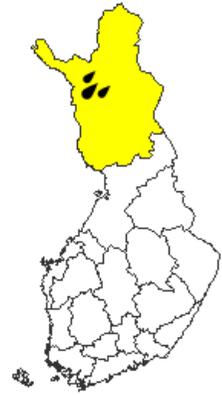
# Warnings Plugin



# Introduction

- New tool for meteorologists, in use since 04/2015
- Implemented as an interactive GUI plugin to Smartmet II
- Used to create and edit warning data and to launch generation of warning products and their delivery
- Archive of old warnings available (searchable with warning type, severity, area and time)
- Also includes a warning text editor
  - With this tool a meteorologist can edit automatically created warning texts and launch generation of warning text products and their delivery

Valitut tasot  
Saatava tieto



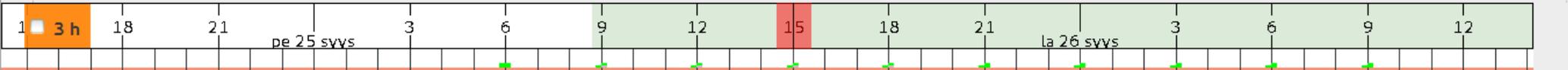
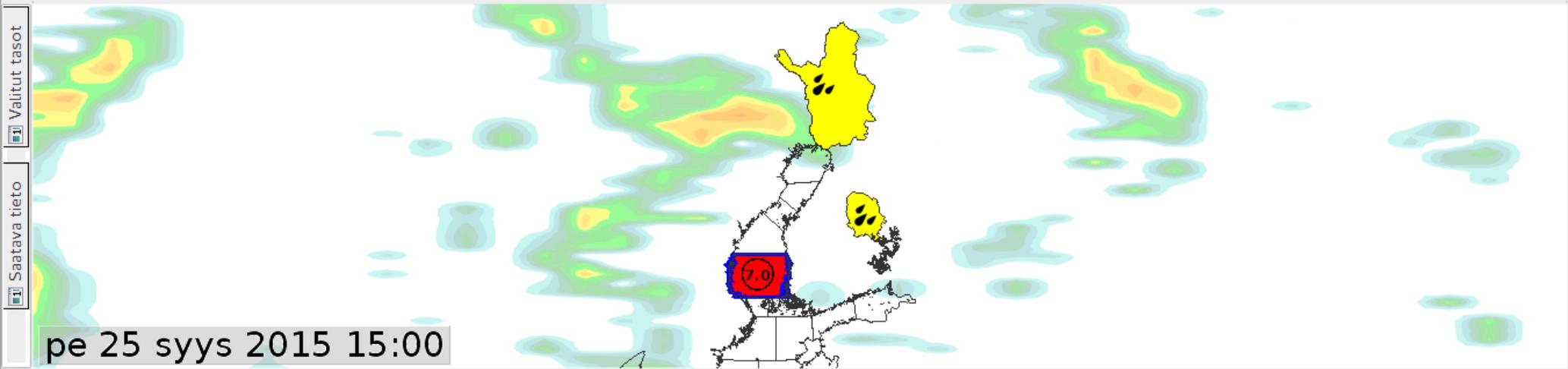
pe 25 syys 2015 09:00



- VAROITUKSET
- Tuuli merellä
- Meriveden korkeus
- Aallonkorkeus
- Jäättäminen
- Ukkospuuskat merellä
- Tuuli maalla
- Raju ukonilma
- Sade
- Liikennesää
- Jalankulku
- Ruohikkopalo
- Metsäpalo
- Helle
- Pakkanen
- UV

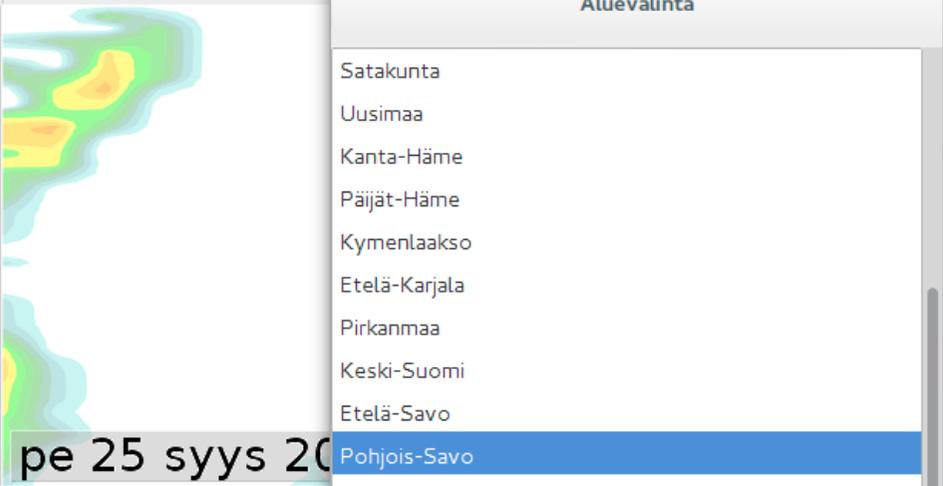


60

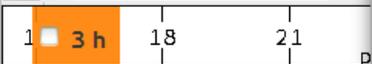


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Valitut tasot  
Saatava tieto



pe 25 syys 20

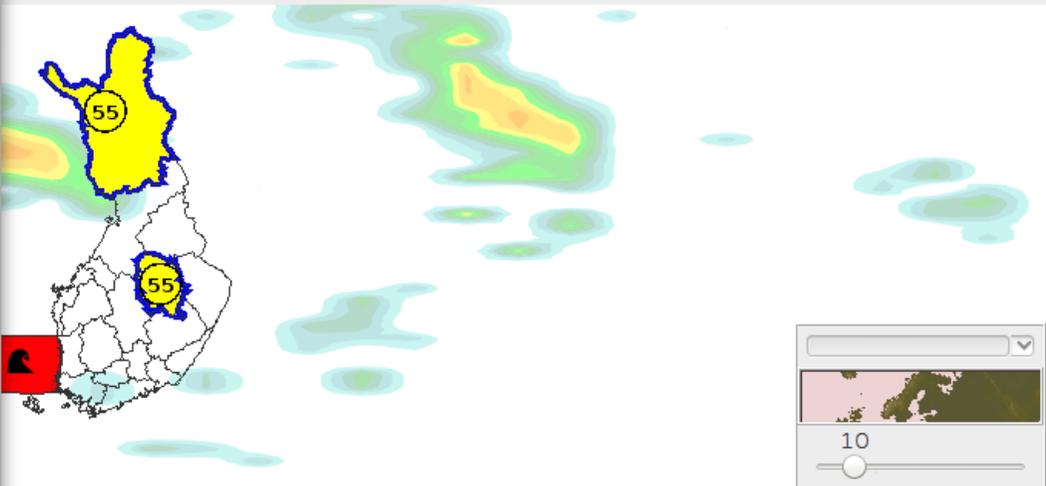


- VAROITUKSET
- Tuuli merellä
- Meriveden korkeus
- Aallonkorkeus
- Jäätyminen
- Ukkospuuskat merellä
- Tuuli maalla
- Raju ukonilma
- Sade
- Liikennesää
- Jalankulku
- Ruohikkopalo
- Metsäpalo
- Helle
- Pakkanen
- UV

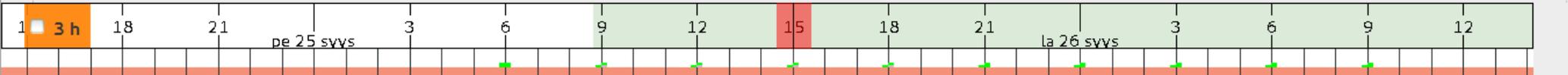
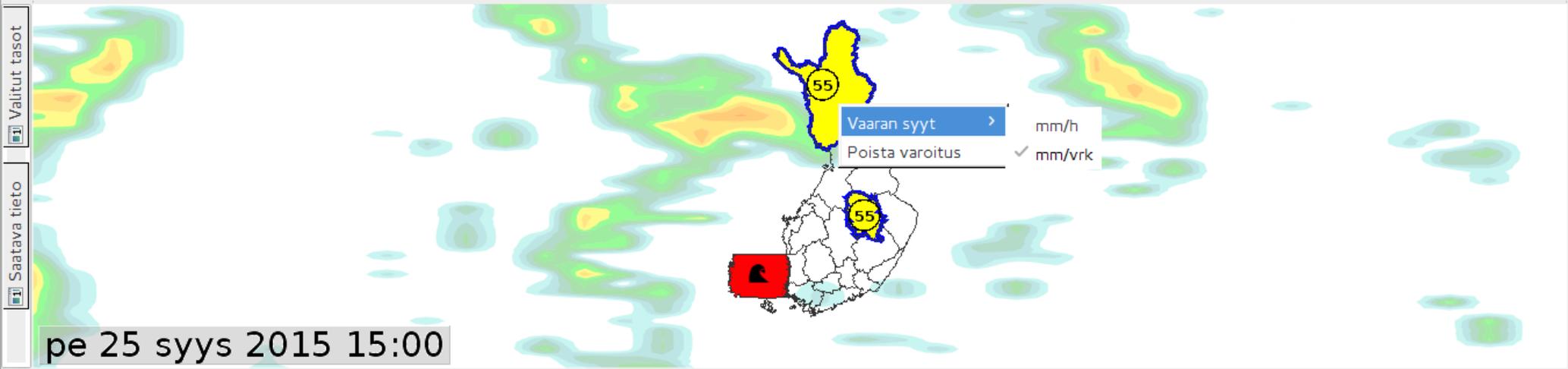
### Aluevalinta

- Satakunta
- Uusimaa
- Kanta-Häme
- Päijät-Häme
- Kymenlaakso
- Etelä-Karjala
- Pirkanmaa
- Keski-Suomi
- Etelä-Savo
- Pohjois-Savo**
- Pohjois-Karjala
- Etelä-Pohjanmaa
- Pohjanmaa
- Keski-Pohjanmaa
- Pohjois-Pohjanmaa
- Kainuu
- Lappi**
- Lapin kunnat ja Lapin osat
- Pohjois-Pohjanmaan kunnat

Poista

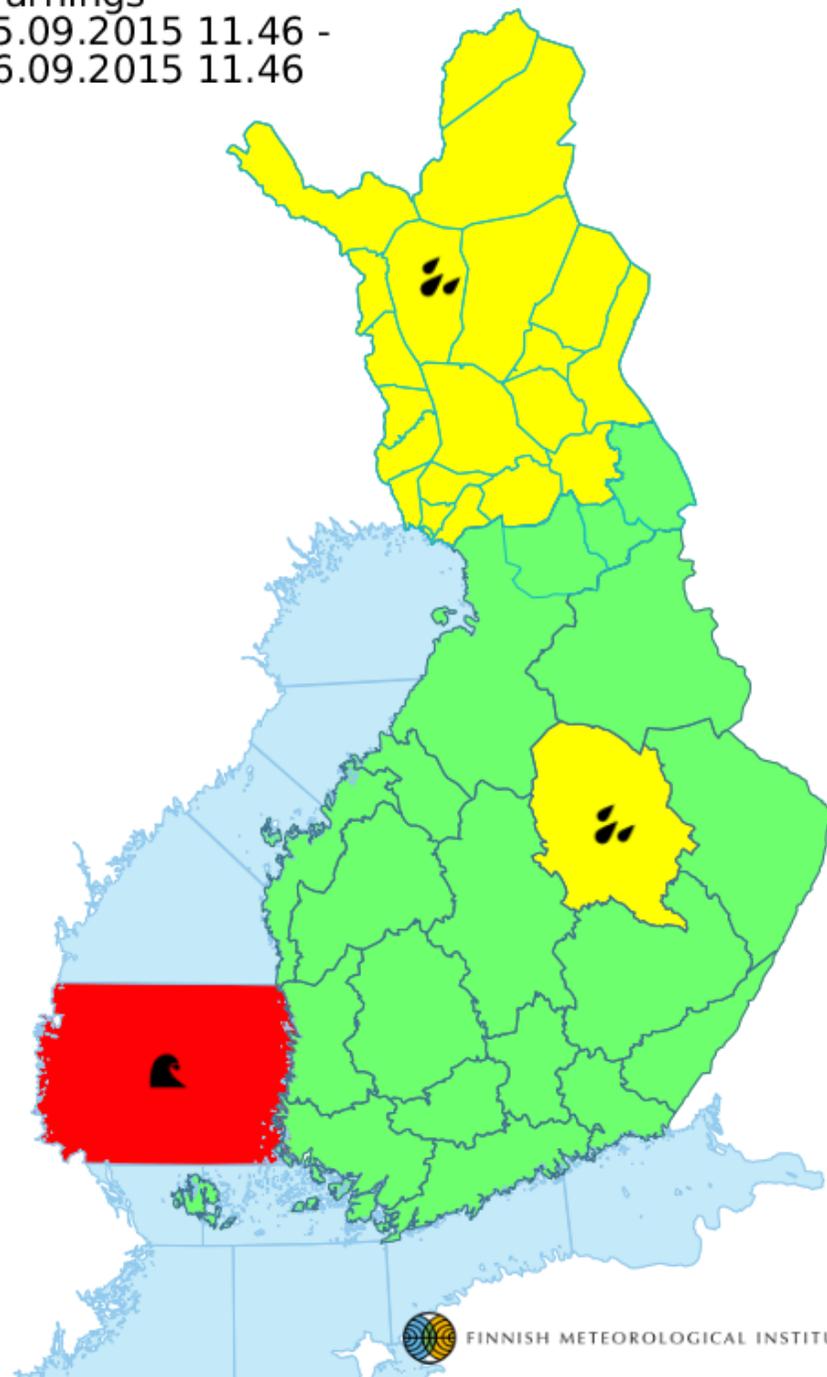


15	18	21	3	6	9	12
la 26 syys						
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55						



VAROITUKSET	1	3 h	18	21	pe 25 syys	3	6	9	12	15	18	21	la 26 syys	3	6	9	12
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<input type="checkbox"/> Pakkanen																	
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Warnings  
25.09.2015 11.46 -  
26.09.2015 11.46



## Radiotekstit

Lähivuorokauden varoitukset  Ennakkovaroitukset

Varoitukset julkaistu:

Editoitavat varoitukset



Tekstit julkaistu:

Näytä kaikki

Suomeksi:

Aallonkorkeus

tiivistä



Aallokkovaroitus: Selkämeren eteläosassa esiintyy illalla myrskyaallokkoa, jossa merkitsevä aallonkorkeus ylittää 7 metriä.

Sade

tiivistä



Sadevaroitus: Pohjois-Savon ja Lapin maakunnissa voi sataa illalla runsaasti, yli 55 mm vuorokaudessa.

Ruotsiksi:

Aallonkorkeus



Varning för sjögång: På södra Bottenhavet förekommer på kvällen stormvågor, där den signifikanta våghöjden överstiger 7 meter.

Sade



Nederbördsvarning: I landskapen Norra Savolax och Lappland kan det på kvällen förekomma riklig nederbörd, mer än 55 mm i dygnet.

Englanniksi:

Aallonkorkeus



Wave height warning: Extremely rough waves occur in Southern Sea of Bothnia in the evening. Significant wave height exceeds 7 meters.

Sade



Heavy rain warning: In provinces Pohjois-Savo and Lapland in the evening heavy rain of more than 55 mm in the 24 hours can be expected.



# Output production



# Output

- Currently WOML is saved to MongoDB (temporary solution)
- WOML = Weather Objects Modelling Language
  - <https://agora.fmi.fi/display/WOML/>
  - Defines meteorological phenomena or other objects in a semantically meaningful way by using GML feature model as the basis of the language
- In progress: WOML input to PostGIS database
  - Initial plan was through Geoserver via WFS-T but Geoserver WFS-T does not support complex features (does output them though)
  - Result: Smartmet II output requestable from standard WFS and WMS interfaces

```
▼<ns:SevereWeatherForecast xmlns:ns="http://xml.fmi.fi/namespace/woml/textfct/2012/11/15" xmlns:ns1="http://www.opengis.net/gml/3.2"
  ns1:id="temp-al639ea9-9860-4b2d-8e39-721721aec003">
  <ns1:identifier codeSpace="urn:x-finnish-meterological-institute:warning">urn:x-finnish-meterological-institute:warning:wind</ns1:identifie
▼<ns1:boundedBy>
  ▼<ns1:Envelope srsName="EPSG:4326" srsDimension="2">
    <ns1:lowerCorner>-5.559248889263472 56.21546327175238</ns1:lowerCorner>
    <ns1:upperCorner>39.446251601223736 68.89258973404195</ns1:upperCorner>
  </ns1:Envelope>
</ns1:boundedBy>
▼<ns2:member xmlns:ns2="http://xml.fmi.fi/namespace/woml/core/2012/11/15">
  ▼<ns:ParameterValueSetArea xmlns:ns="http://xml.fmi.fi/namespace/woml/quantity/2012/11/15" ns1:id="temp-6330ecb0-c9ed-4ce2-90aa-
  43249f0bc772">
    ▼<ns:parameterValueSet>
      ▼<ns:GeophysicalParameterValueSet>
        ▼<ns:parameterValue>
          ▼<ns:GeophysicalParameterValue>
            ▼<ns:parameter>
              ▼<ns:GeophysicalParameter>
                <ns:reference scheme="fmi">Wind direction</ns:reference>
                <ns:localizedName xml:lang="EN-en">Wind direction</ns:localizedName>
              </ns:GeophysicalParameter>
            </ns:parameter>
          ▼<ns:value>
            ▼<ns:FlowDirectionMeasure>
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                ▼<ns1:DirectionVector>
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          </ns:value>
          ▼<ns:elevation>
            ▼<ns2:Elevation ns1:id="temp-7e7f88ba-9b76-4415-9c28-6d3544376c0f">
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            </ns2:Elevation>
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        </ns:parameter>
      </ns:parameterValue>
    </ns:parameterValueSet>
  </ns:ParameterValueSetArea>
</ns2:member>
</ns:SevereWeatherForecast>
```



# Products

- The following warning products are generated from WOML:
  - Bitmap graphics to be displayed for example at the FMI public web site and in FMI mobile applications
  - XML syntaxes
    - CAP (MeteoAlarm)
    - Several FMI specific XML syntaxes (clients) is saved to MongoDB
- Warning texts
  - Warning text products are generated separately from other warning products
  - Warning text suggestions are created automatically from the published warning data
  - Meteorologists can edit automatically generated texts before publishing them



# User and developer experiences



# The project

- Development was done following a scrum-like process
  - One month sprints with monthly face-to-face meetings with the users
  - Developer meetings once a week
- JIRA with agile plugin as the project management tool
  - Also used by the end users
  - Avoid email as much as possible, prefer JIRA and instant messaging
- Essential: end-users involved from the beginning
  - Demands time and involvement from the users but is worth it
  - Our users were committed to the project -> scrum process worked well



# Warning plugin – the good

- Easy to see the big picture – all warnings from 0-120h in the same view
- Very fast to use once you master the shortcut keys
- No more long drop-down menus or small popups compared to the old system
- Warning editing very smooth (levels, time, area)
- Ability to specify free areas (not tied to municipalities etc.)
- Ability to get best guesses for certain warning types (more to come)
- Simultaneous use from more than one workstation
- Easy to change warning level thresholds or to add new warning types
- Estimated 20-40% time saving compared to the old system



# Warning plugin – the “could be better”

- Java not always the easiest platform (unable to start workstation due to accidental updates to newer versions, security level tightenings, ...)
- Automatic text generation still needs further development
- Random lag/slowness in situations with a lot of warnings
- Optimized for experienced users ie. Not so easy for the newcomer
- Problems with MeteoAlarm CAP, still using the old tool for this
  - MeteoAlarm CAP profile based on Google’s profile, not fully standards compliant with CAP 1.2



**Thank you!**  
**Questions?**

