

A web application for landslide inventory using data-driven SVG

Maurizio Latini

<latini@unisi.it>

Centro di Geotecnologie - Universita' di Siena

Barend Köbben

<kobben@itc.nl>

International Institute for Geo-information Science
and Earth Observation (ITC)



Overview



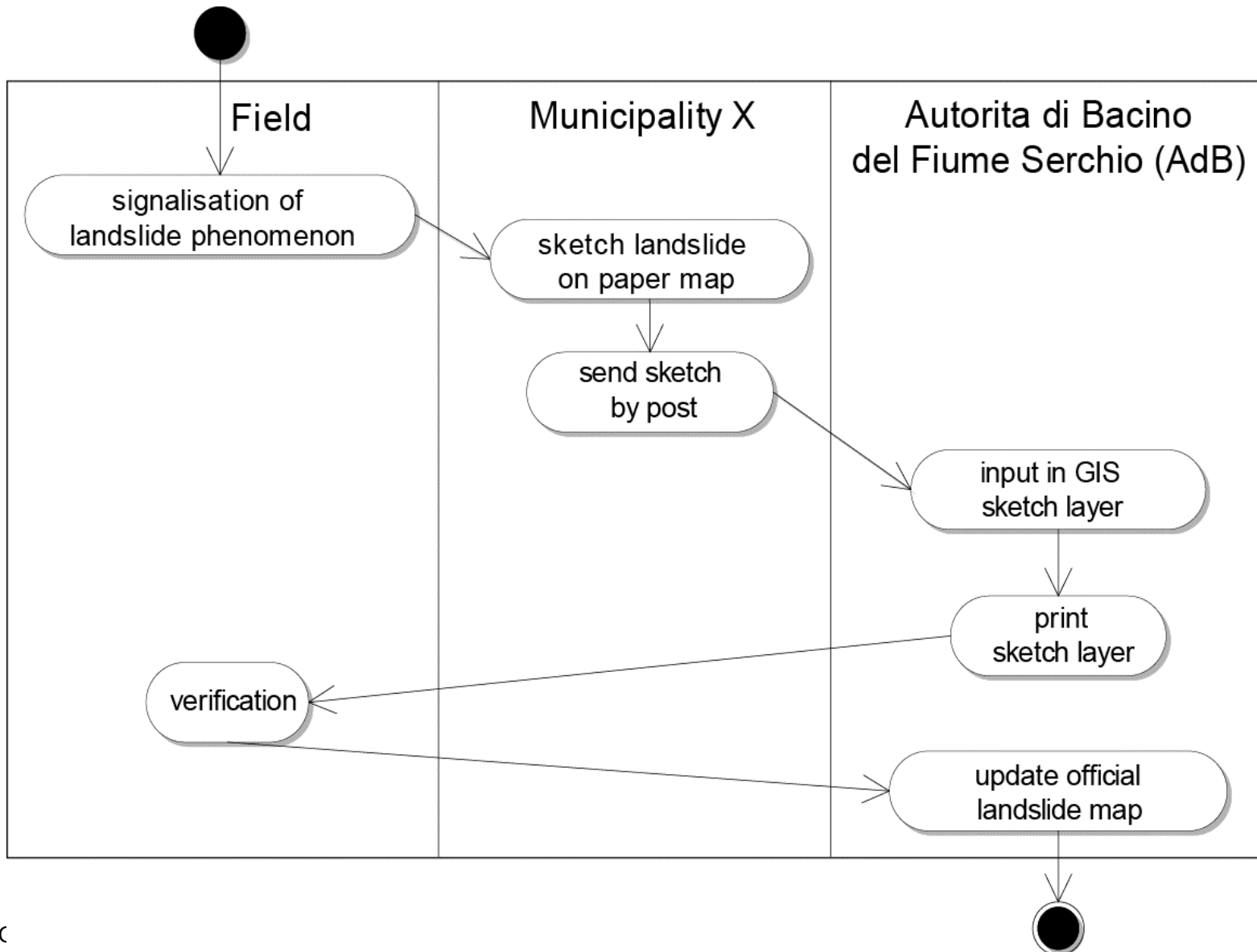
- Help municipalities with inventory of landslides for the landslide map of Serchio basin (Tuscany – Italy)
- Using simple, lightweight web application client-side [SVG-only]
- Using 'GDI-Light' setup server-side [open standards, open source]

Italian official landslide maps

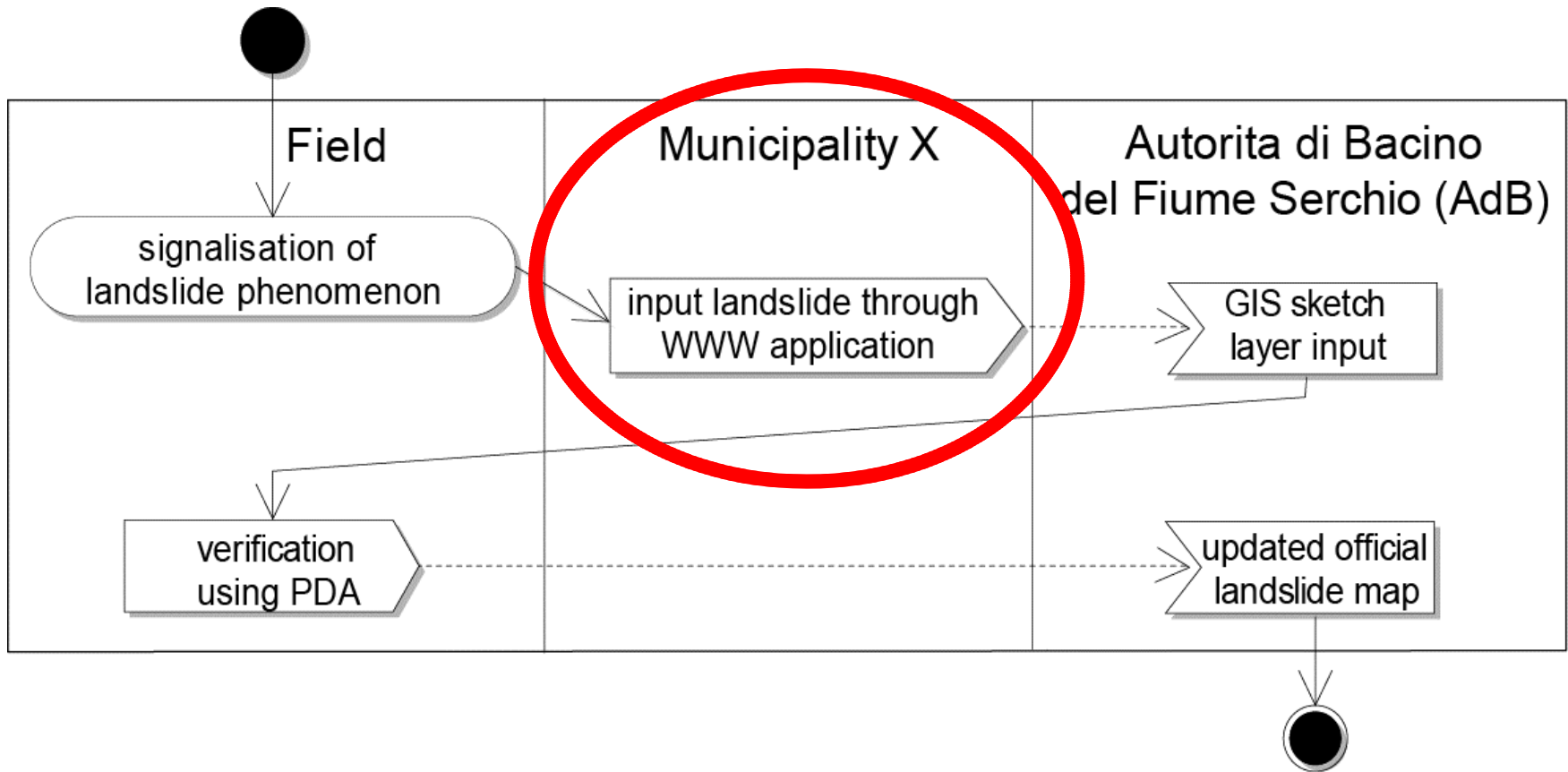


- Responsibility for publishing placed:
 - sometimes at central authority level (eg. Regions)
 - sometimes at local authorities level (**Autorita' di Bacino**)
- Local municipalities play an important "part in the middle": they inventory landslide events

Current update process



Future update process



Inventory application requirements

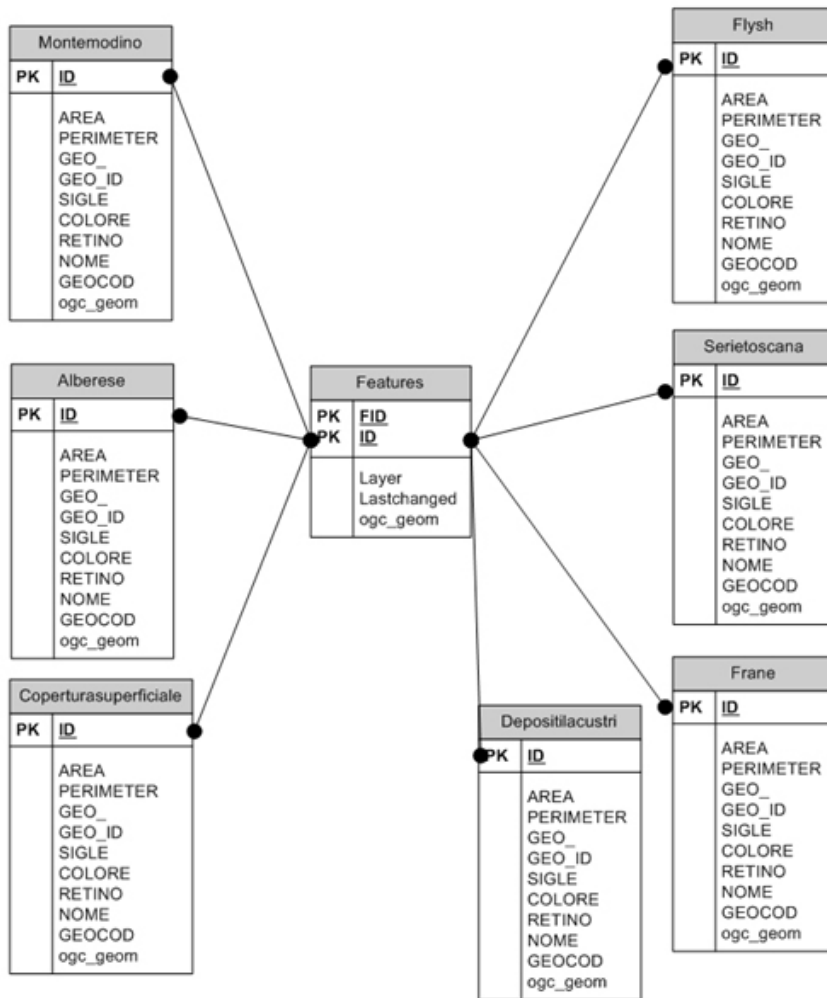


- speed up & simplify the process
- with the limited possibilities of the municipalities in mind:
 - (very) small, in size and manpower
 - located in sometimes inaccessible sites
 - no GIS capabilities
 - only limited bandwidth for web access
- ➔ light-weight webbased client-side
- ➔ all bussiness logic server-side



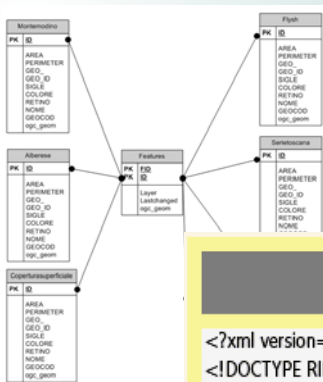
- lightweight Geo-Data infrastructure based on Open Standards and Open Source software
- testbed/playing ground at ITC
- server-side focus on MySQL, Java, opensource OGC services
- client-side focus on SVG
- first result was "RIMapper"
 - used as starting point

serverside setup using RIMapper



- MySQL DB with OGC SFS support
- stores all features as objects with OGC geometry

serverside setup using RIMapper

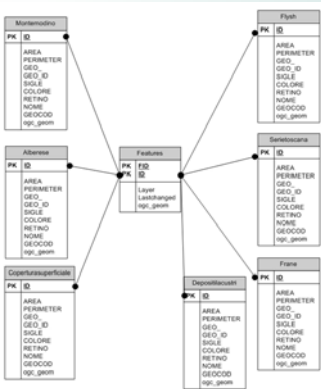


- simple XML map configuration files to define map layout and interactivity

XML - configuration

```
<?xml version="1.0" encoding="iso-8859-1" ?>
<!DOCTYPE RIM PUBLIC "" "/RIMapper/XML/RIM.dtd">
<RIM TYPE="SVG_STANDALONE" DB="rimapper" UN="un" PW="pw">
<HEADER>
  <FRAGMENT DBID="default" NAME="root" TYPE="SVG_ROOT"/>
  <STYLES>
    <STYLE DBID="default" NAME="defPoint" TYPE="CSS"/>
    <STYLE DBID="default" NAME="defLine" TYPE="CSS"/>
    <STYLE DBID="default" NAME="defArea" TYPE="CSS"/>
  </STYLES>
  <FRAGMENT DBID="default" NAME="init" TYPE="ECMASCRIPT"/>
  <FRAGMENT DBID="default" NAME="show" TYPE="ECMASCRIPT"/>
</HEADER>
<LAYERS>
  <LAYER DBID="default" NAME="ward" STYLETYPE="single"
    STYLE="defLine" />
  <LAYER DBID="default" NAME="river" STYLETYPE="single"
    STYLE="defArea" >
    <ACTION TYPE="simple" NAME="showRIM" SCOPE="feature"
      EVENT="onclick" PARAMS="evt, 'id'"/>
  </LAYER>
  <LAYER DBID="default" NAME="roads" STYLETYPE="single"
    STYLE="defArea" ATTRIBS="type" />
  <LAYER DBID="default" NAME="build" STYLETYPE="single"
    STYLE="defArea" />
</LAYERS>
<FOOTER>
</RIM>
```

serverside setup using RIMapper

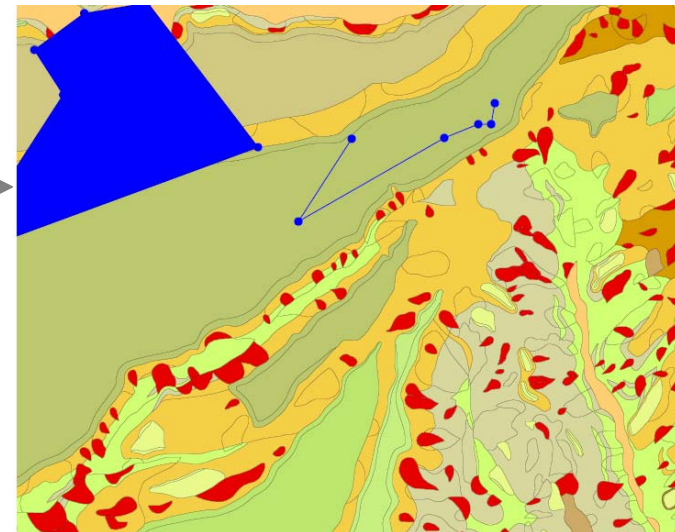


- Java servlets to deliver SVG output (=application)

makeSVG

XML2SVG

parseXML



Map Coordinates
X: 1618964
Y: -4881467

Zoom IN
Zoom OUT
Full Extent
Show Legend
Hide Legend

Start Digitizing
Stop Digitizing

```
XML - configuration
<?xml version="1.0" encoding="iso-8859-1"?>
<!DOCTYPE RIM PUBLIC "" "RIMMapperXML/RIM.dtd">
<RIM TYPE="SVG_STANDALONE" DB="" RIMMapper="UN" UN="" PW="">
<HEADER>
<FRAGMENT DBID="" default" NAME="" root" TYPE="SVG_ROOT"/>
<STYLES>
<STYLE DBID="" default" NAME="" defPoint" TYPE="CSS"/>
<STYLE DBID="" default" NAME="" defLine" TYPE="CSS"/>
<STYLE DBID="" default" NAME="" defArea" TYPE="CSS"/>
<STYLES>
<FRAGMENT DBID="" default" NAME="" init" TYPE="ECMASCRIPT"/>
<FRAGMENT DBID="" default" NAME="" show" TYPE="ECMASCRIPT"/>
<HEADER>
<LAYER>
<LAYER DBID="" default" NAME="" road" STYLETYPE="single"
STYLE="" defLine" />
<LAYER DBID="" default" NAME="" river" STYLETYPE="single"
STYLE="" defArea" />
<ACTION TYPE="single" NAME="" showRIM" SCOPE="" feature"
EVENT="" onclick" PARAMS="" evt, " id"/>
<LAYER>
<LAYER DBID="" default" NAME="" roads" STYLETYPE="single"
STYLE="" defArea" />
<LAYER DBID="" default" NAME="" build" STYLETYPE="single"
STYLE="" defArea" />
</LAYER>
</FOOTER>
</RIM>
```



simplest XML configuration...

```
AdBsimple.xml
1 <?xml version="1.0" encoding="iso-8859-1"?>
2 <!DOCTYPE RIM PUBLIC "" "" ../RIM.dtd">
3 <RIM TYPE="SVG_STANDALONE" DB="adb" UN="adb" PW="latini">
4   <TITLE>A map</TITLE>
5   <AUTHOR>By me</AUTHOR>
6   <HEADER>
7     <STYLES>
8       <FRAGMENT DBID="default" NAME="defSVGRoot" TYPE="SVG_ROOT"/>
9       <STYLE DBID="default" NAME="defArea" TYPE="CSS"/>
10    </STYLES>
11    <FRAGMENT DBID="default" NAME="defInit" TYPE="ECMASCRIPT"/>
12  </HEADER>
13  <LAYERS>
14
15 </LAYERS>
16 <FOOTER/>
17 </RIM>
18
```



..adding data-driven colours

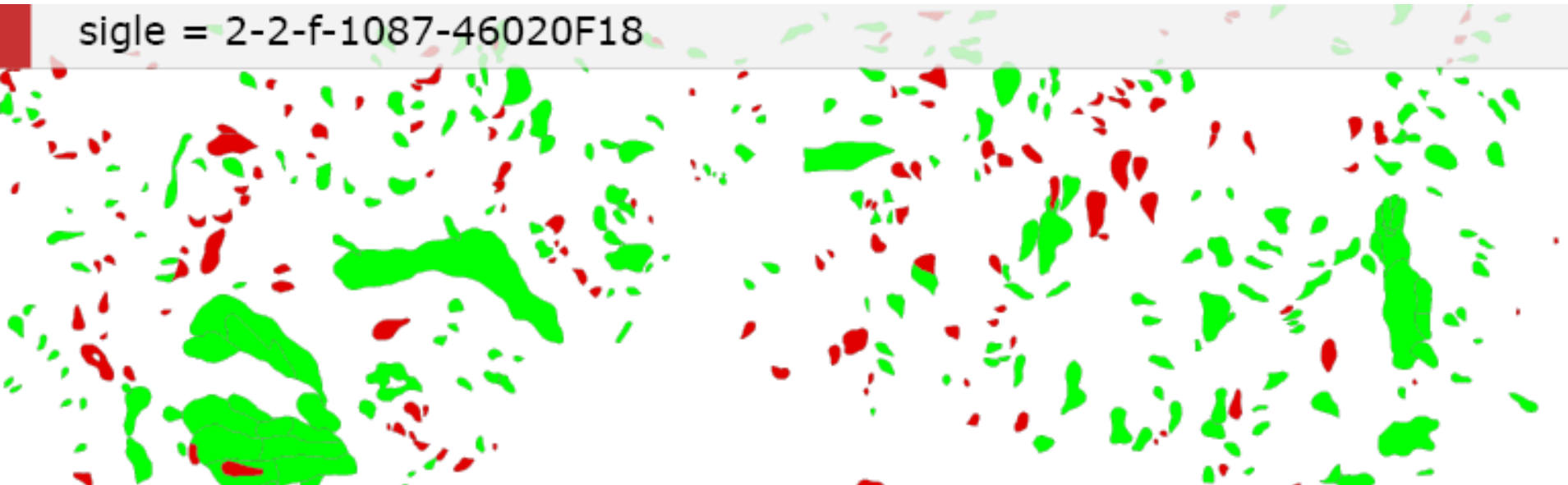
```
AdBcolore.xml
1 <?xml version="1.0" encoding="iso-8859-1"?>
2 <!DOCTYPE RIM PUBLIC "" "" ../RIM.dtd>
3 <RIM TYPE="SVG_STANDALONE" DB="adb" UN="adb" PW="latini">
4   <HEADER>
5     <STYLES>
6       <FRAGMENT DBID="default" NAME="defSVGroot" TYPE="SVG_ROOT"/>
7       <STYLE DBID="default" NAME="defArea" TYPE="CSS"/>
8       [REDACTED]
9     </STYLES>
10    <FRAGMENT DBID="default" NAME="defInit" TYPE="ECMASCRIPT"/>
11  </HEADER>
12  <LAYERS>
13    <LAYER DBID="default" NAME="frane" [REDACTED] STYLE="colore" ATTRIBS="colore, sigle">
14    </LAYER>
15  </LAYERS>
16  <FOOTER/>
17 </RIM>
```



...adding interactivity

```
AdBcoloreClick.xml
1 <?xml version="1.0" encoding="iso-8859-1"?>
2 <!DOCTYPE RIM PUBLIC "" "../RIM.dtd">
3 <RIM TYPE="SVG_STANDALONE" DB="adb" UN="adb" PW="latini">
4 <HEADER>
5 <STYLES>
6 <FRAGMENT DBID="default" NAME="defSVGRoot" TYPE="SVG_ROOT"/>
7 <STYLE DBID="default" NAME="defArea" TYPE="CSS"/>
8 <STYLE DBID="none" NAME="franecolore1" TYPE="CSS"><![CDATA[fill:rgb(225,0,0); stroke-width:0.323; stroke:rgb
9 <STYLE DBID="none" NAME="franecolore2" TYPE="CSS"><![CDATA[fill:rgb(0,255,0); stroke-width:0.323; stroke:rgb
10 <STYLE DBID="none" NAME="franecolored" TYPE="CSS"><![CDATA[fill:rgb(0,0,255); stroke-width:0.323; stroke:rgb
11 </STYLES>
12 <FRAGMENT DBID="default" NAME="defInitPlusRIMmessage" TYPE="ECMASCRIPT"/>
13
14 </HEADER>
15 <LAYERS>
16 <LAYER DBID="default" NAME="frane" STYLETYPE="chorochromatic" STYLE="colore" ATTRIBS="colore. side">
17
18
19 </LAYER>
20 </LAYERS>
21 <FOOTER/>
22 </RIM>
```

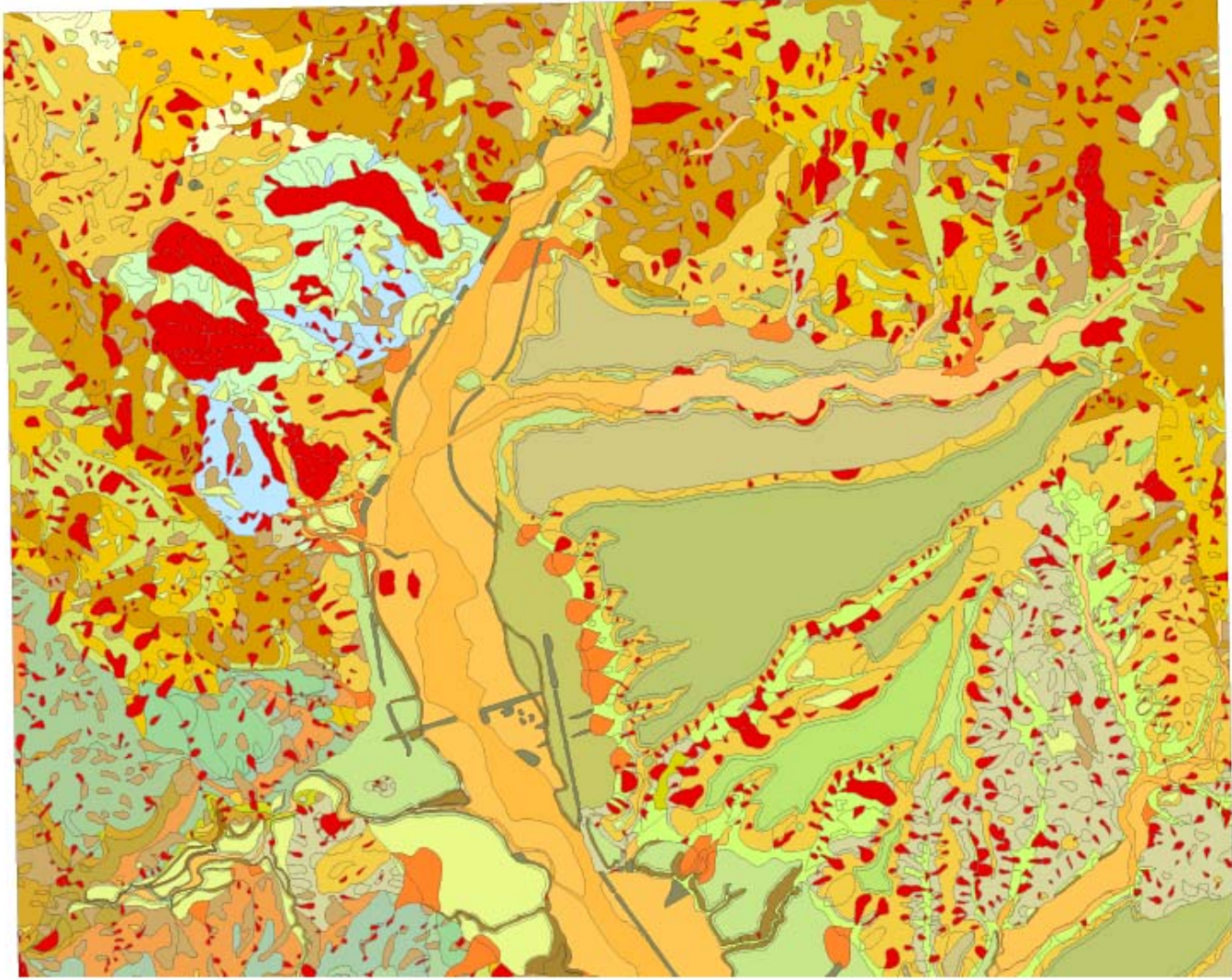
sigle = 2-2-f-1087-46020F18



resulting application



- Frane
f
- Coperture superficiali
Lg
all
all1
all2
at
at1
at2
at3
at4
at5
at6
br
c
cr
ct
dt
rp
- Depositi fluvio-lacustri
arg
cg
ct/mg
- Flysh a Elmintoidi
fh
- Gruppo dell'Alberese
cb
- Unità di Monte Modino
aM
fP1
- Serie Toscana
Nu
cA
cc
cm
cs1
cs2
di
mac
mg
mp
ol
sc



Zoom IN

Zoom OUT

Full Extent

Show Legend

Hide Legend

Navigation icons: Home, Previous, Next, Stop, Refresh, etc.

Map Coordinates
X: 1614979
Y: -4883807

Start Digitizing

Stop Digitizing

resulting application



The screenshot displays a GIS application interface. The main window shows a geological map with various colored regions (purple, orange, green, yellow) and red spots. An "Alert" dialog box is open in the center, containing the following text:

Alert

! Name of the geological formation: Coperture superficiali
Abbreviation: E-o-all₁
Cartographic abbreviation: all₁

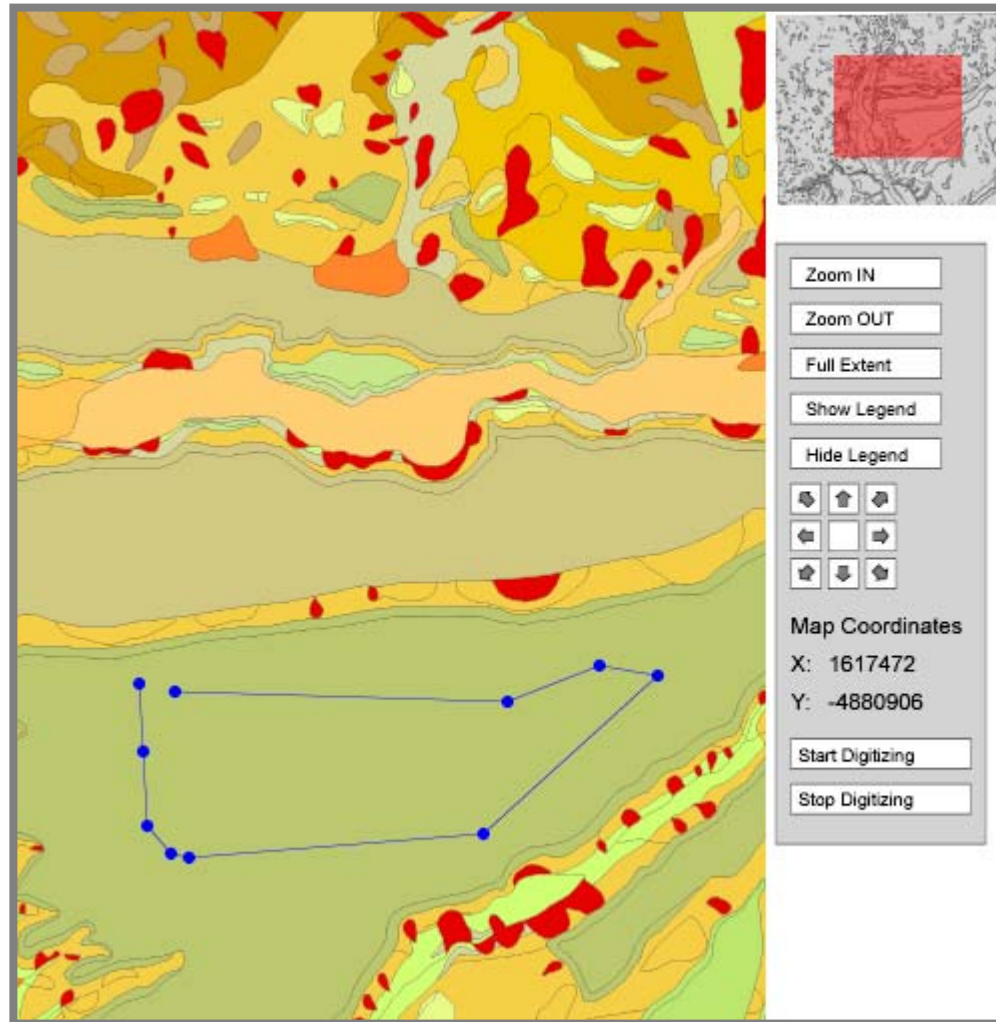
OK

To the right of the map is a control panel with the following elements:

- Zoom IN button
- Zoom OUT button
- Full Extent button
- Show Legend button
- Hide Legend button
- Navigation icons (up, down, left, right arrows)
- Map Coordinates section:
 - X: 1615583
 - Y: -4880588
- Start Digitizing button
- Stop Digitizing button

At the top right of the control panel, there is a small inset map showing the current view area in red.

resulting application



conclusions and further work



- only first step towards “Landslide Web Map” for AdB
- improvements planned are:
 - tiling (only load data needed) and client-side caching
 - more appropriate map backgrounds
 - vertex-level editing