

# An introduction to KML, Google Earth and practical 2

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# Real applications can be:

- Large, made up of multiple files. 10,000+ lines of Fortran is not uncommon.
- Complex, relying on external libraries, MPI etc.
- Not “owned” by the you. Other programmers may not appreciate XML output. It could be that no one person understands the whole application.
- Compiled using a Makefile

# Encapsulation & privacy

```
Program Foo
  Use FoX_wxml
```

```
  ...
```

```
Contains
```

```
  Subroutine Bar
```

```
  ...
```

```
End Subroutine Bar
```

```
  Function F
```

```
  ...
```

```
End Function F
```

```
End Program Foo
```

```
Subroutine Bar2
```

```
  ...
```

```
End Subroutine Bar2
```

```
Subroutine Bar3
```

```
  Use FoX_wxml
```

```
  ...
```

```
End Subroutine Bar3
```

```
Program Foo
  Use Module Bars
  ...
```

Contains

```
  Subroutine Bar
```

...

```
  End Subroutine Bar
```

```
  Function F
```

...

```
  End Function F
```

```
End Program Foo
```

```
Module Bars
  Use FoX_wxml
  Contains
```

```
  Subroutine Bar2
```

...

```
  End Subroutine Bar2
```

```
  Subroutine Bar3
```

...

```
  End Subroutine Bar3
```

```
End Module Bars
```

- Allows a library of higher level, dialect specific interfaces to be written.

```
Call StartXHTML(title="title",  
author="Andrew" ... )
```

- Provides a private space for XML specific variables. State can be maintained.
- Main code “looks” cleaner.
- Easy to isolate FoX for compilation.
- Makes reuse easy.

# Reuse: FoX\_wcml

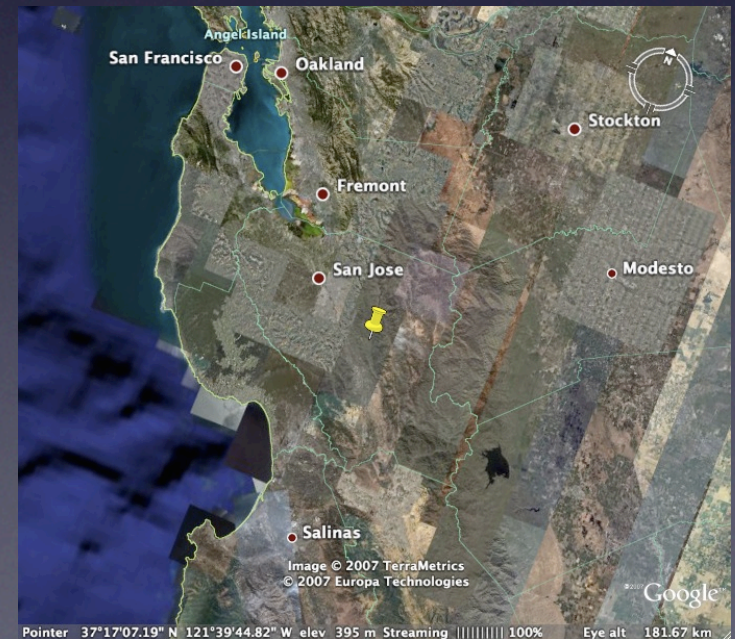
- Provides high level interface for Chemical Markup Language for Computational Chemistry.
- Used in many codes. 1000+ users.
- Developers need know nothing about XML
- Ensures consistent use of the dialect.

Google Earth...



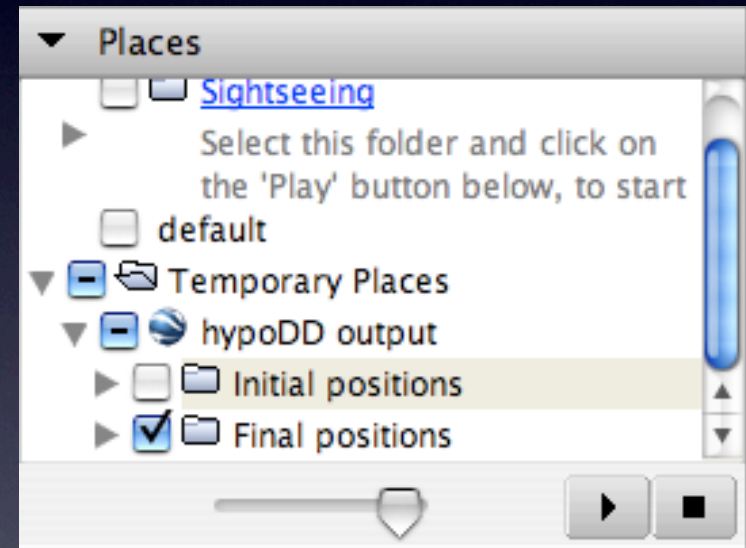
# Keyhole Markup Language (KML)

```
<kml xmlns='http://earth.google.com/kml/2.0'>
  <Placemark>
    <Point>
      <coordinates> long, lat </coordinates>
    </Point>
  </Placemark>
</kml>
```



# Grouping elements

- <Folder>: Group of Placemarks. Can be nested as deeply as needed.
- <Document> - Group of Folders and Styles together.



# Elements belonging to features

- Features include `<Folder>`s, `<Document>`s and `<Placemark>`s.
- `<name>`: text used as label for the object.
- `<description>`: content of description balloon when object is clicked on. GE will attempt to render unformatted text, or include HTML to include formatting. This needs to have special characters replaced with entity references, or be CDATA.

```
<description>
```

```
  <![CDATA[This is an image
```

```
  
```

```
  and we have a link http://www.google.com.]]>
```

```
</description>
```

```
<description>
```

```
<![CDATA[This is an image  
  
and we have a link http://www.google.com.]]>
```

```
</description>
```

```
<description>
```

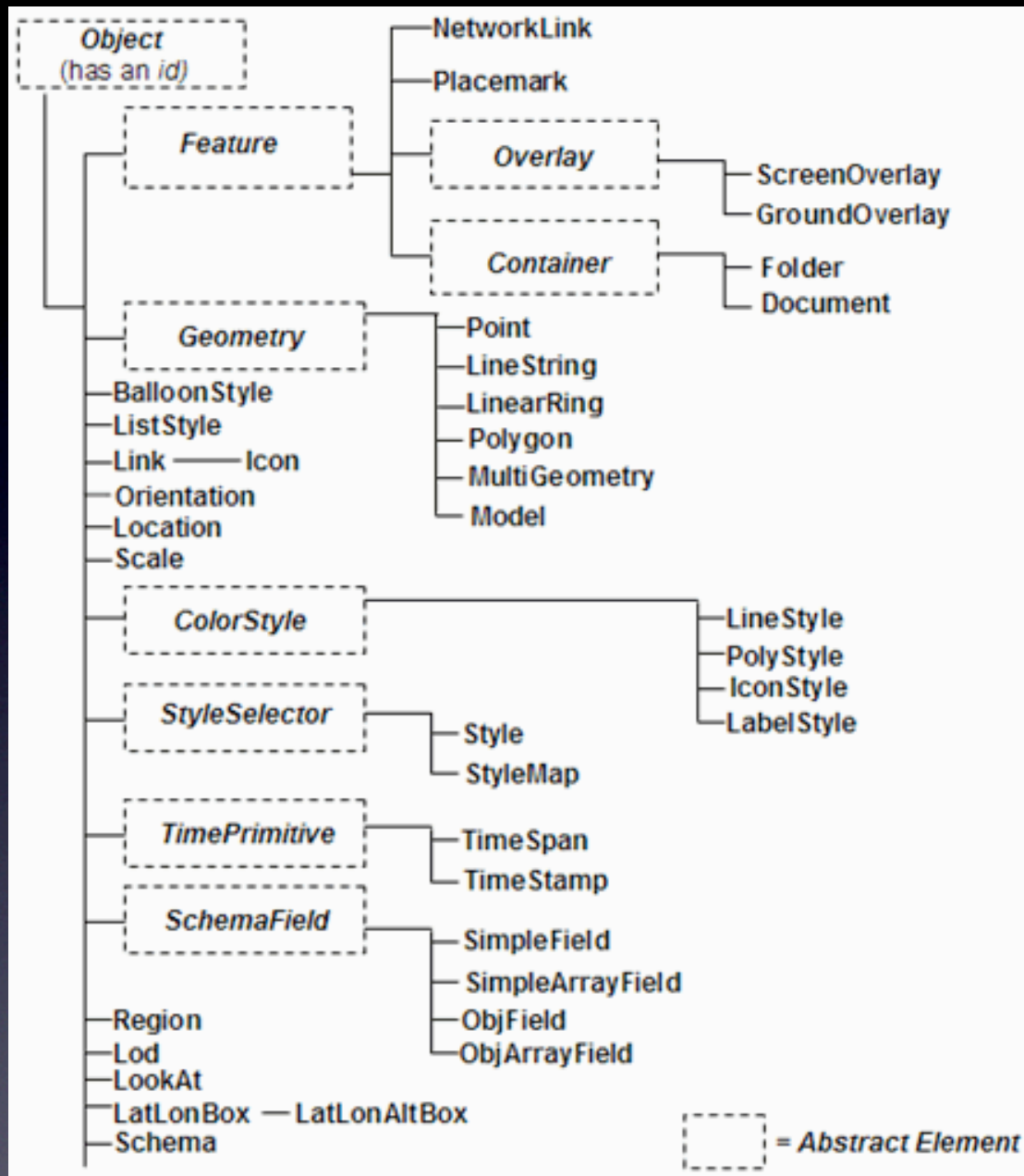
```
<![CDATA[This is an image
```

```

```

```
and we have a link http://www.google.com.]]>
```

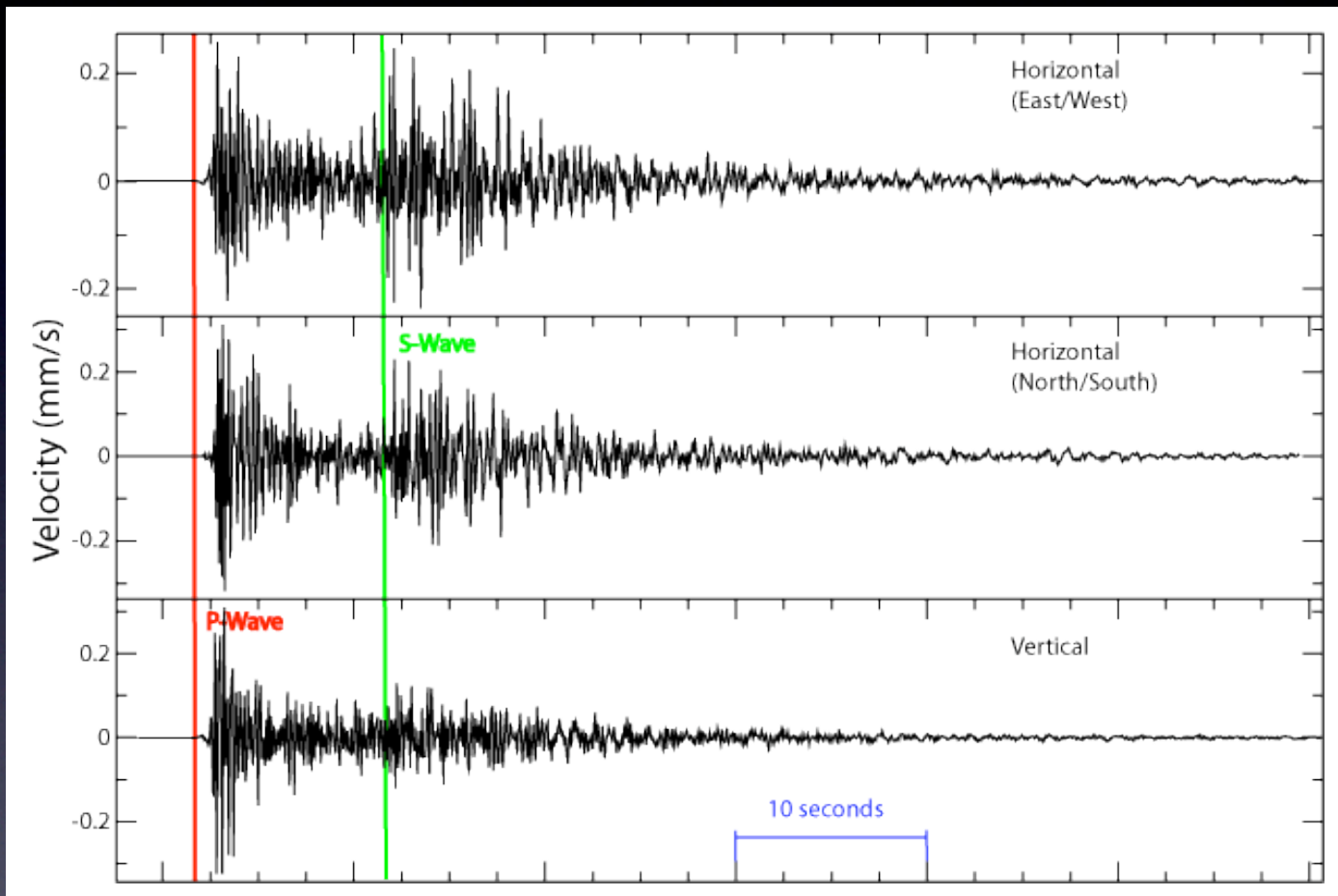
```
</description>
```

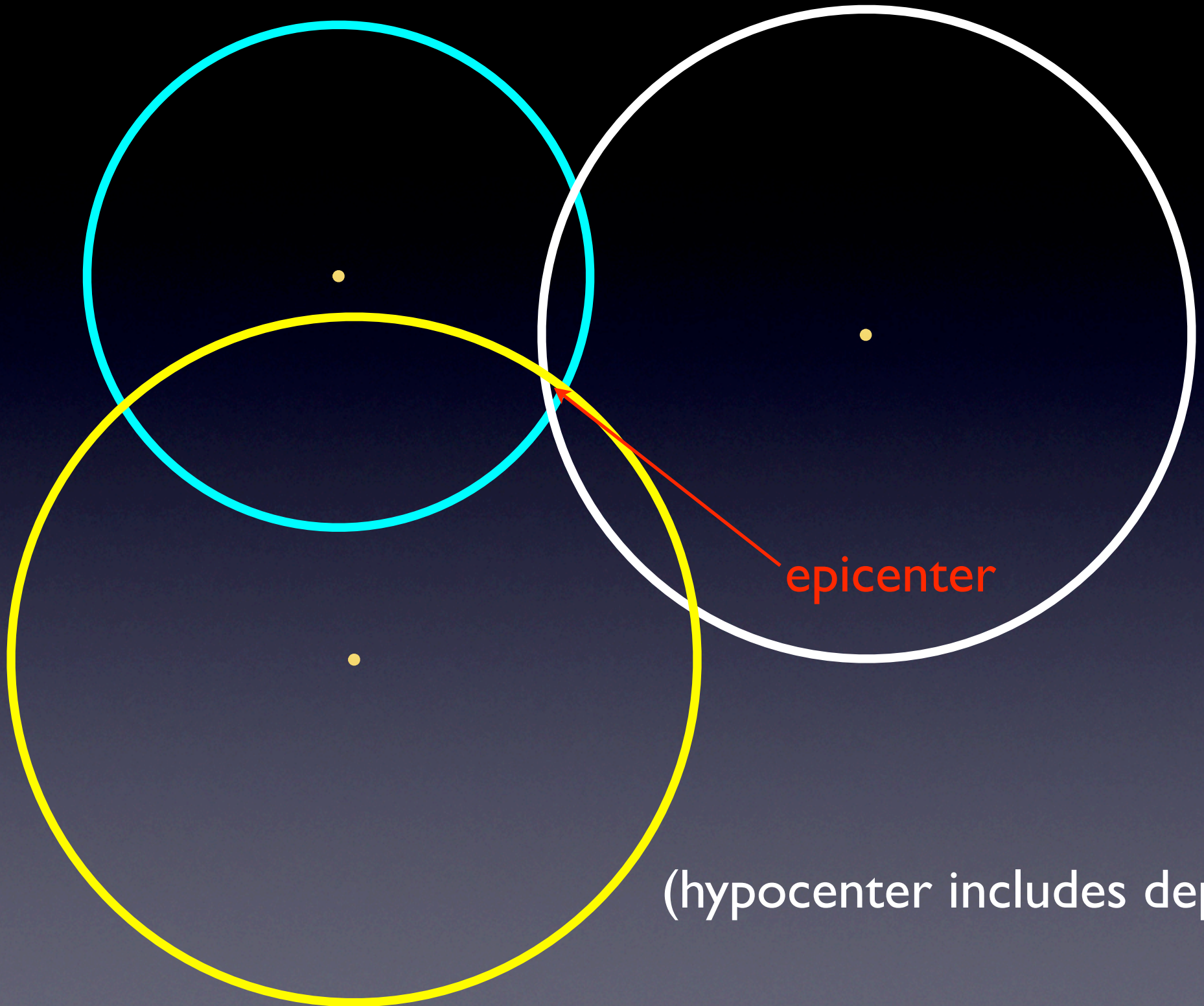


For more information see: <http://earth.google.com/kml/>

What you may want to  
know about HypoDD



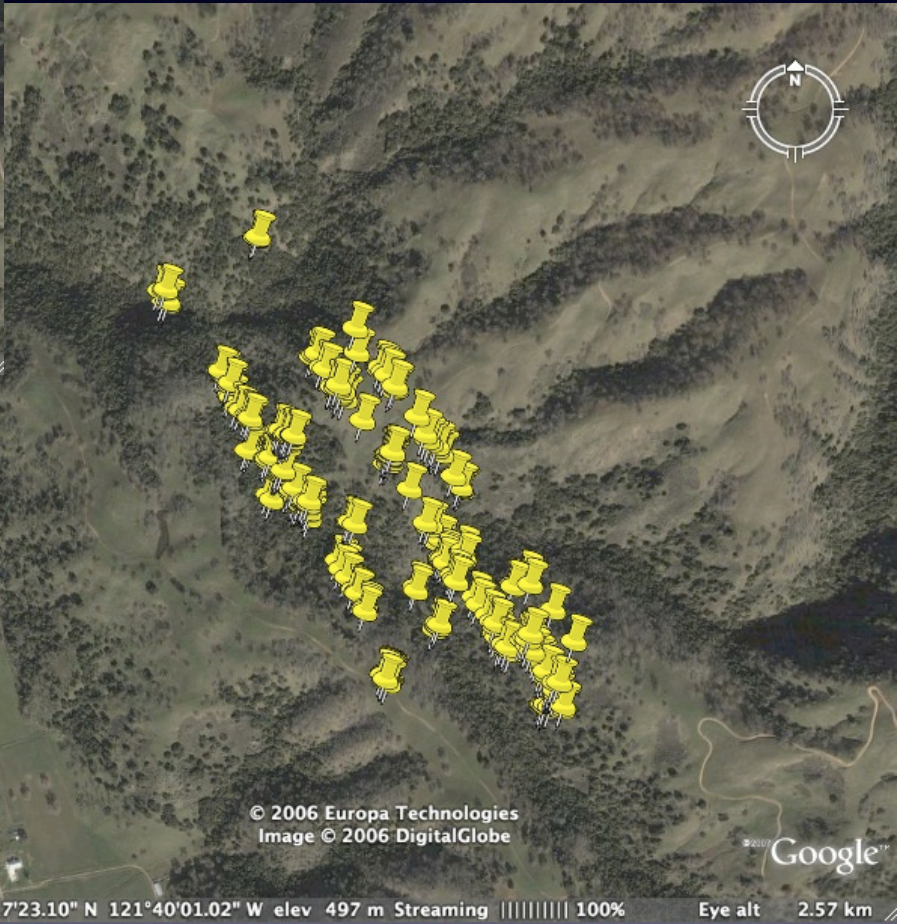
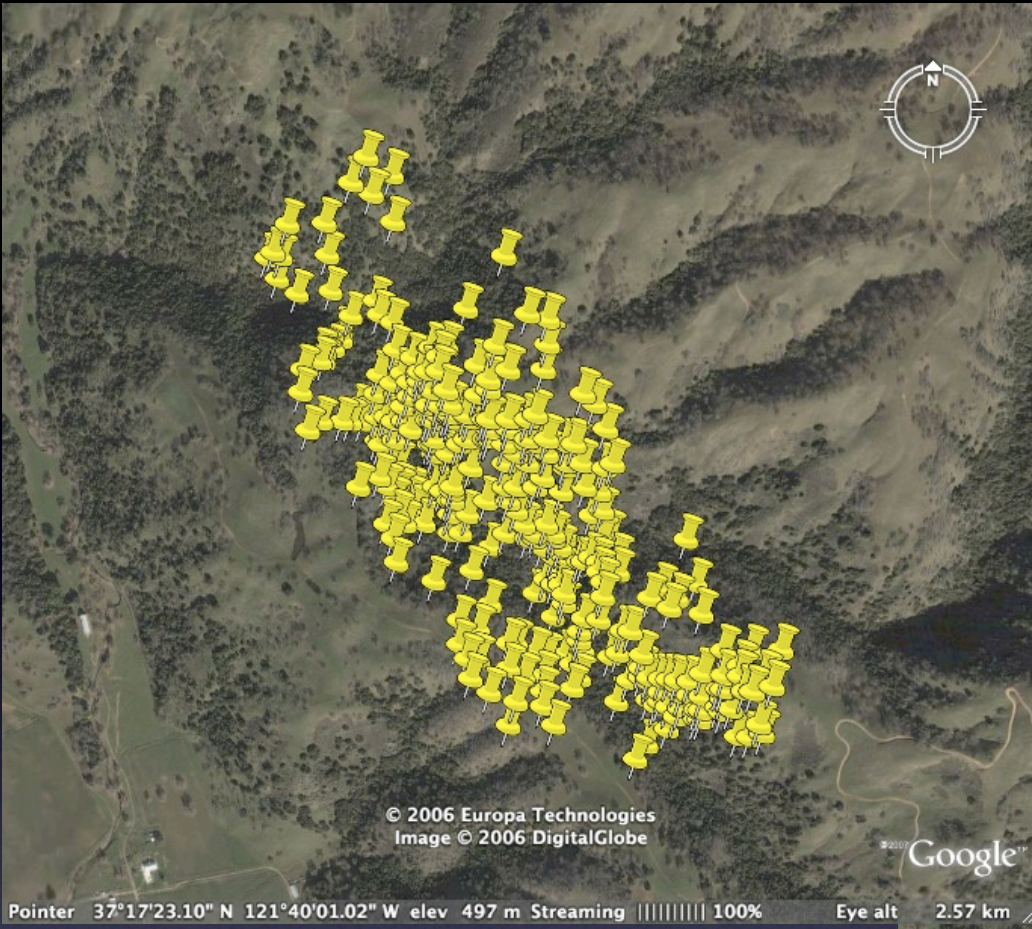




epicenter

(hypocenter includes depth)

HypoDD: refine event location, assuming paths for all rays from a cluster of earthquakes are the same



Uses the double-difference (DD) earthquake location algorithm of Waldhauser and Ellsworth (*Bull. Seism. Soc. Am.*, **90**, 1353-1368, 2000)

# In practical 2 you will:

- Learn how to add FoX to an existing code's build process
- Output simple metadata
- Output data for visualization (KML)
- Output data representing results (quakeML)
- Encapsulate the changes so that they make a small impact to the main code