

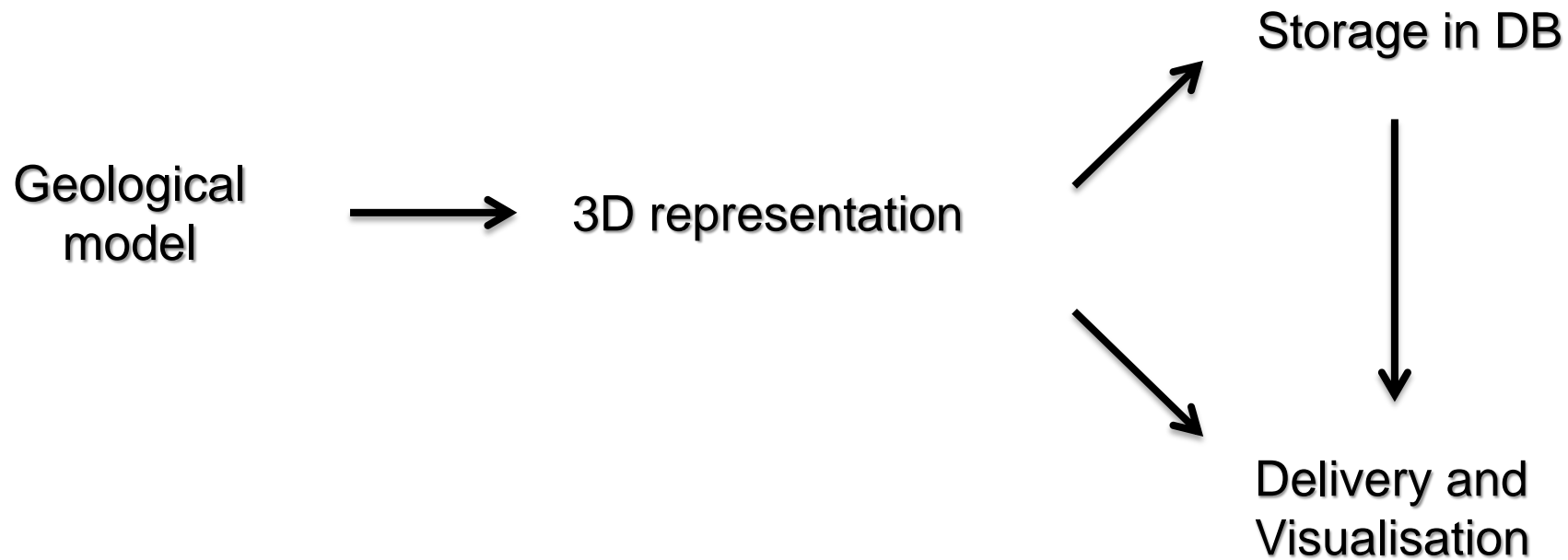


Raising Multiscale 3D Geological Models Interoperability

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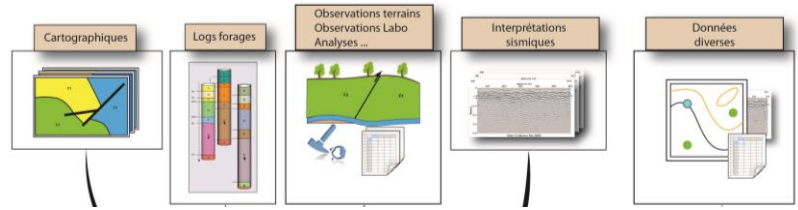
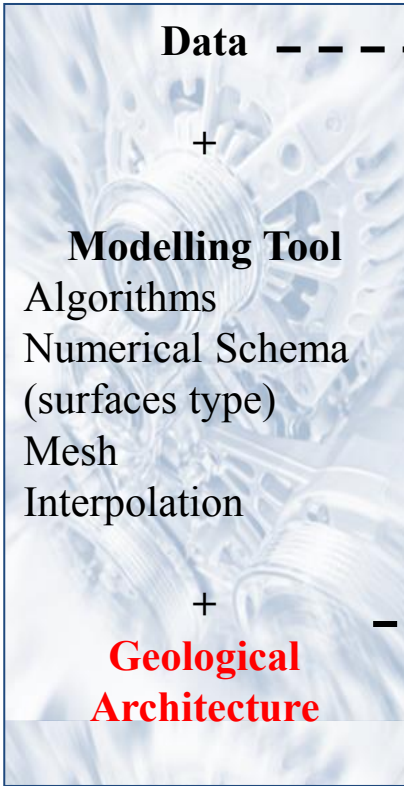
Introduction to geological modelling



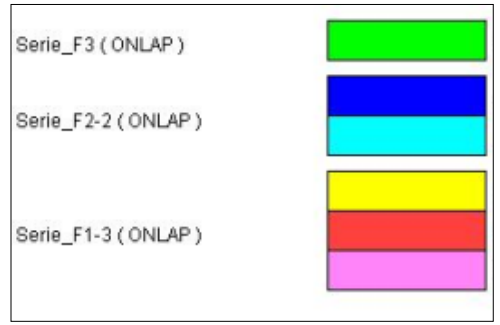
Geological model

Geological model

MODELE



Observation location.
Geometry (explicit)



History and rules to manage the behavior between geological bodies.

Topology (mostly implicit)

Geological model

Geological model

MODELE

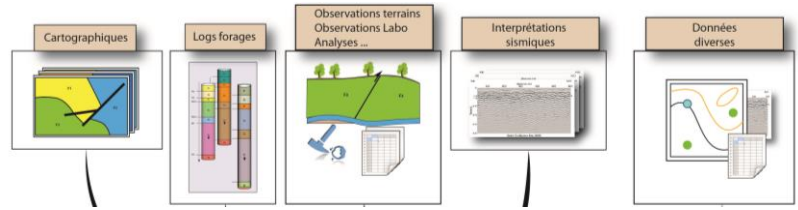
Data - - - - -

+

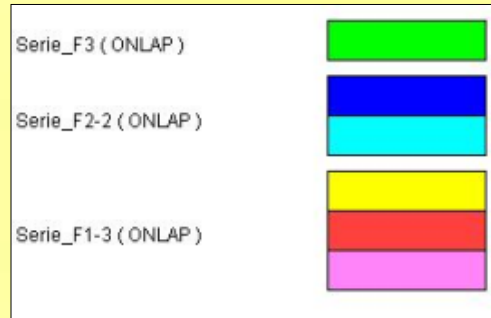
Modelling Tool
Algorithms
Numerical Schema
(surfaces type)
Mesh
Interpolation

+

Geological Architecture



Observation location.
Geometry (explicit)

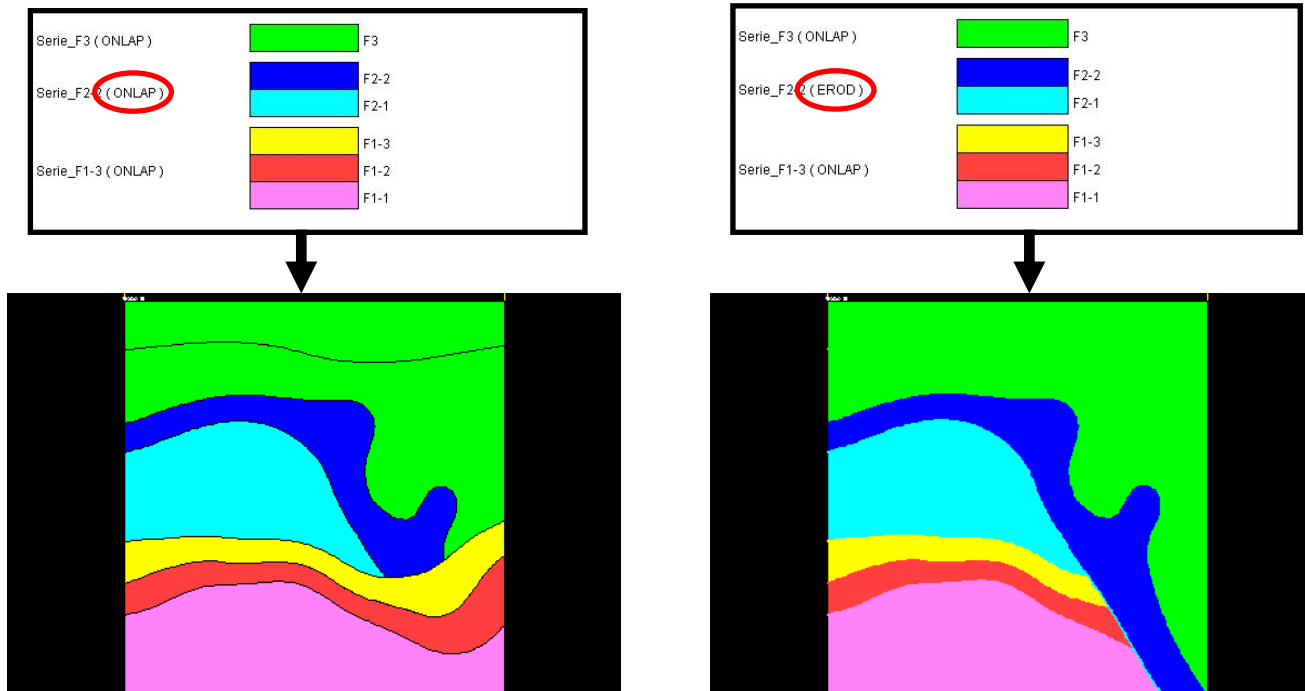


History and rules to
manage the behavior
between geological
bodies.

Topology (mostly implicit)

Geological architecture helps for

- Building automatically a geological model
GA manages the Interaction between geological formations
- Testing various geological interpretations
By changing the Geological Architecture



(Calcagno & al., 2008)

Interoperable Geological Architecture

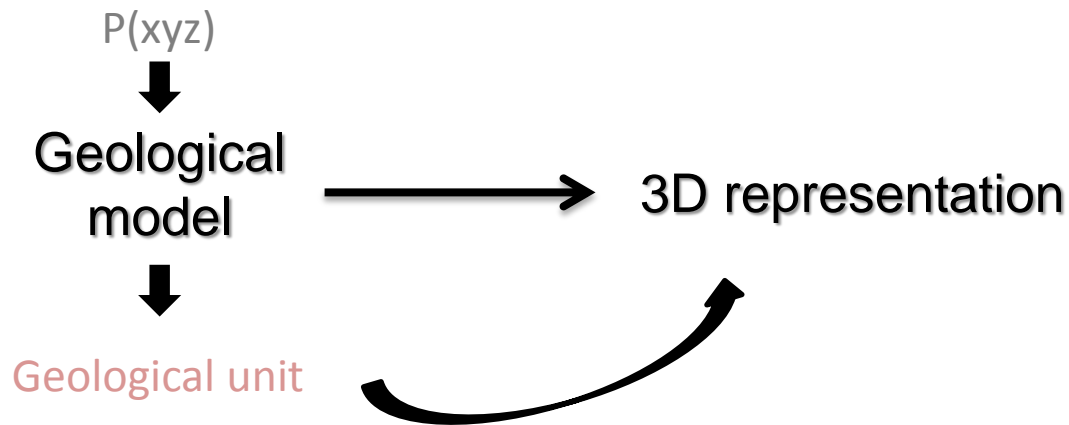


Standardizing the Geological Architecture would help to share it independently from any modelling packages

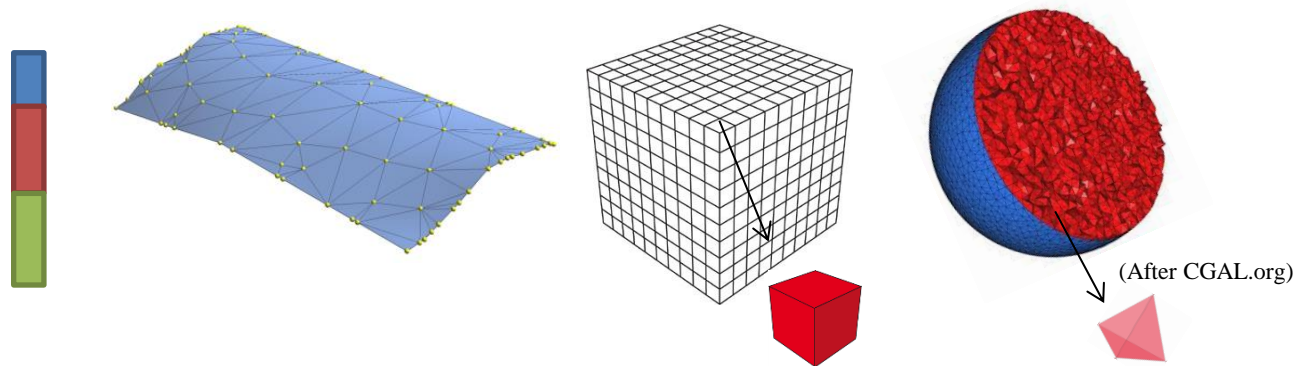
Sharing the Geological Architecture along with the geological model provides a complementary knowledge

Sharing the Geological Architecture along with the data would be sufficient to re-construct the geological model

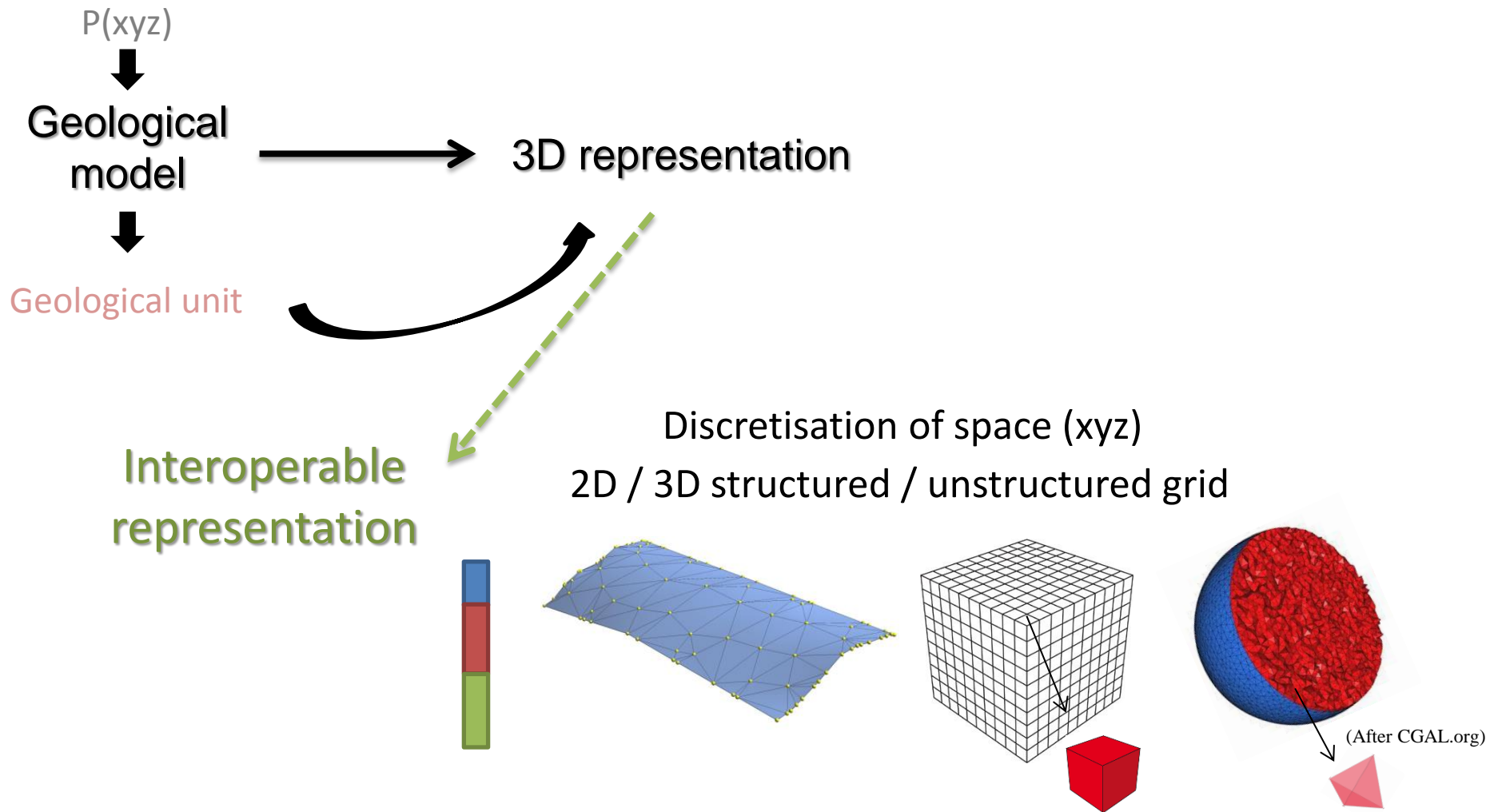
Representations



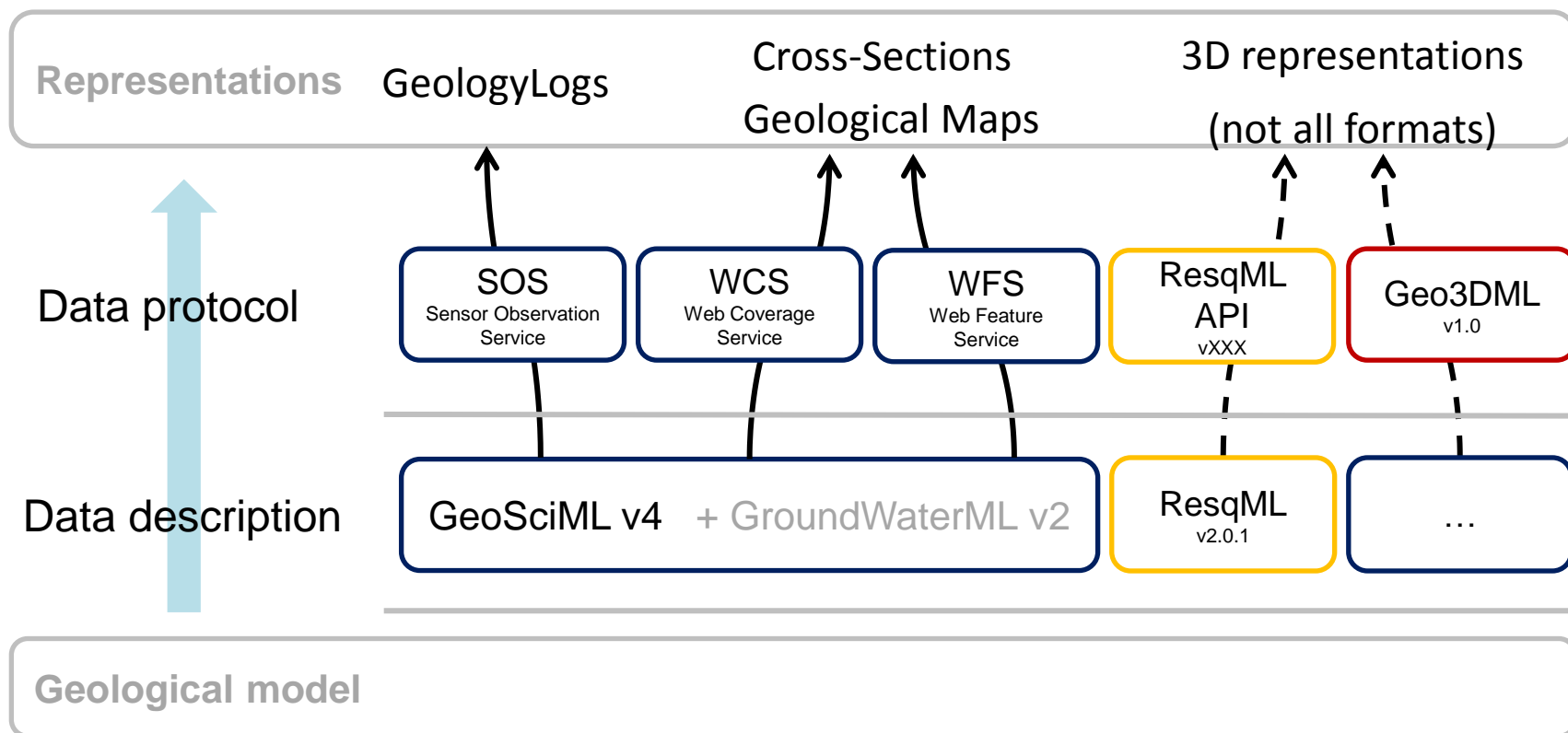
Discretisation of space (xyz)
2D / 3D structured / unstructured grid



Representations

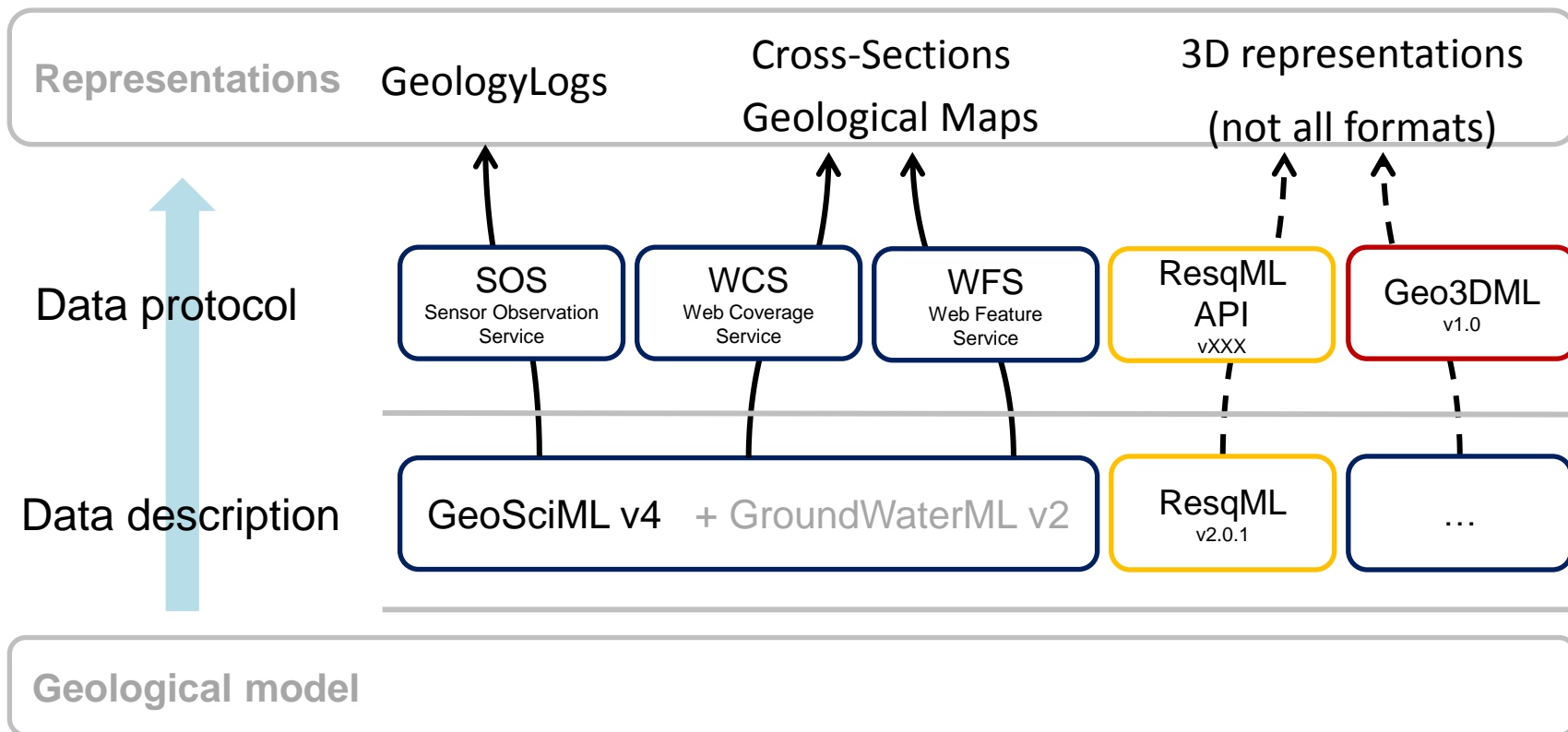


One studied possibility at BRGM (work in progress)

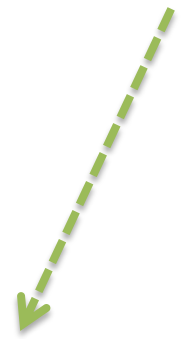
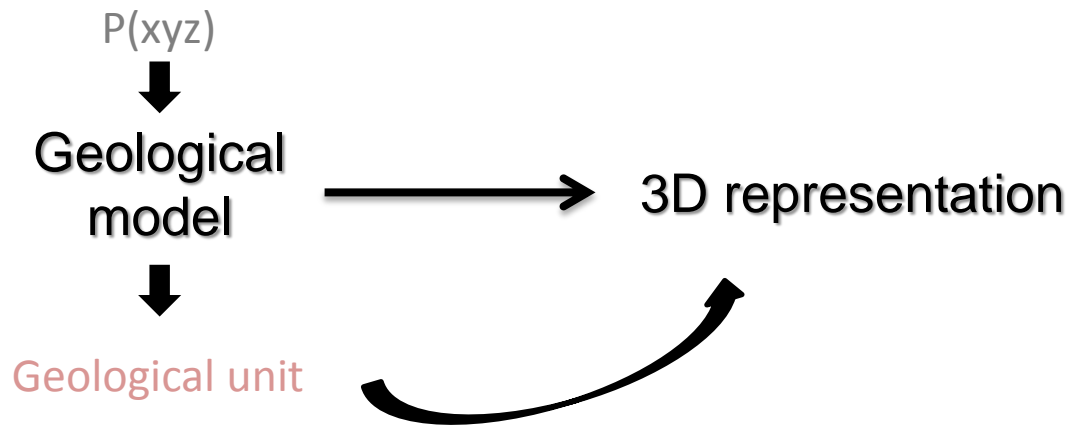


Interoperable representations

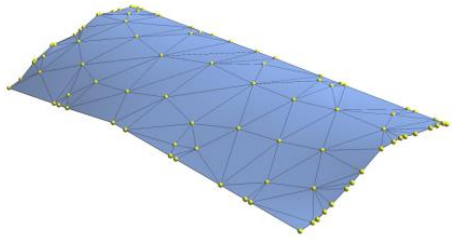
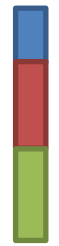
No *de-facto* standard to expose 3D data representations...
but several existing candidates



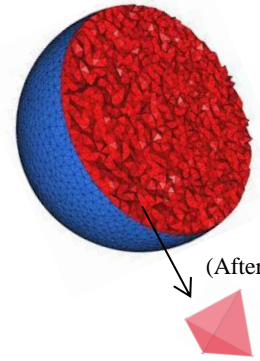
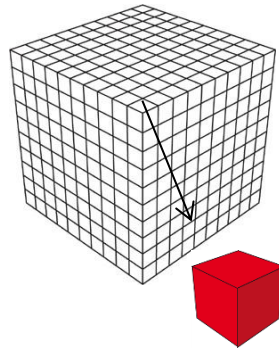
Representation



Interoperable programming interface

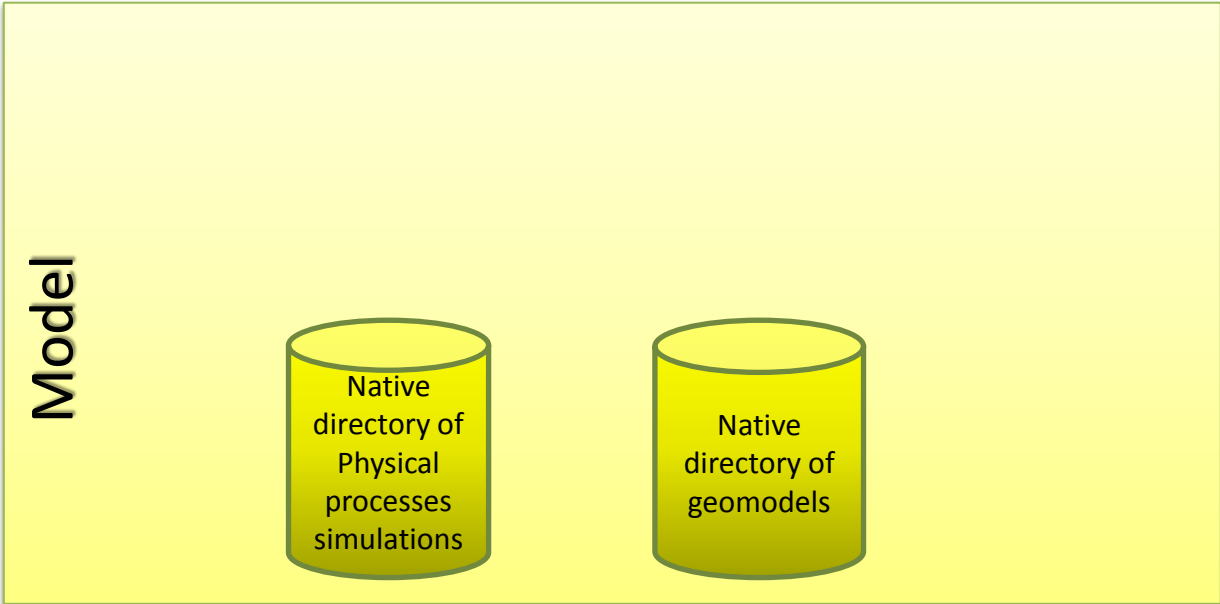


Discretisation of space (xyz)
2D / 3D structured / unstructured grid



(After CGAL.org)

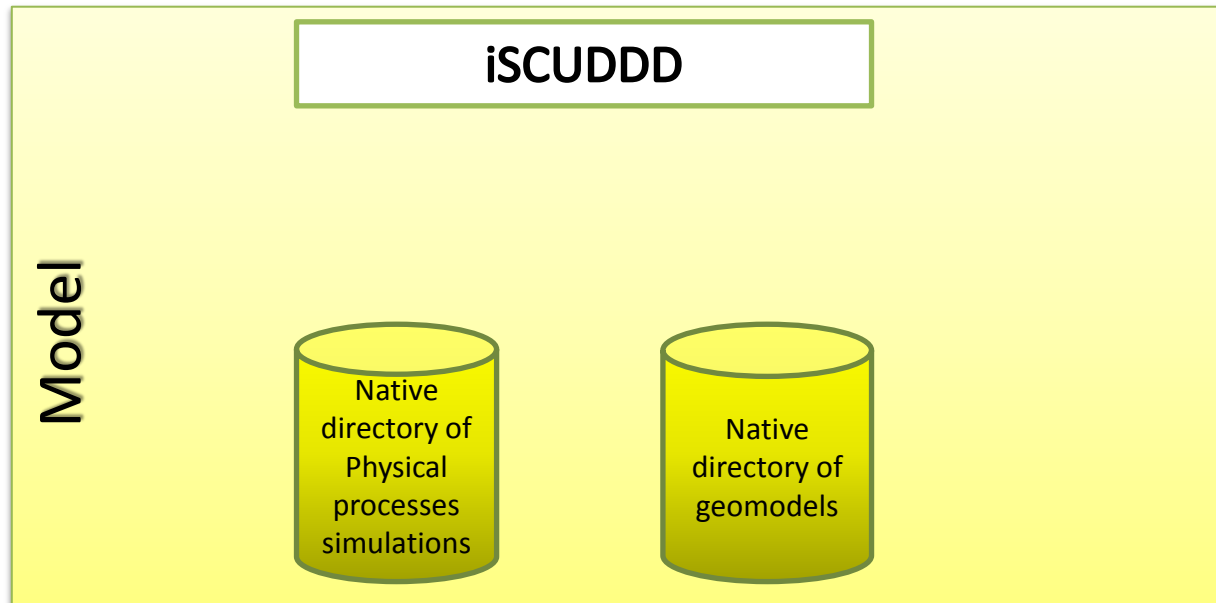
Interoperable programming interface : iScudd



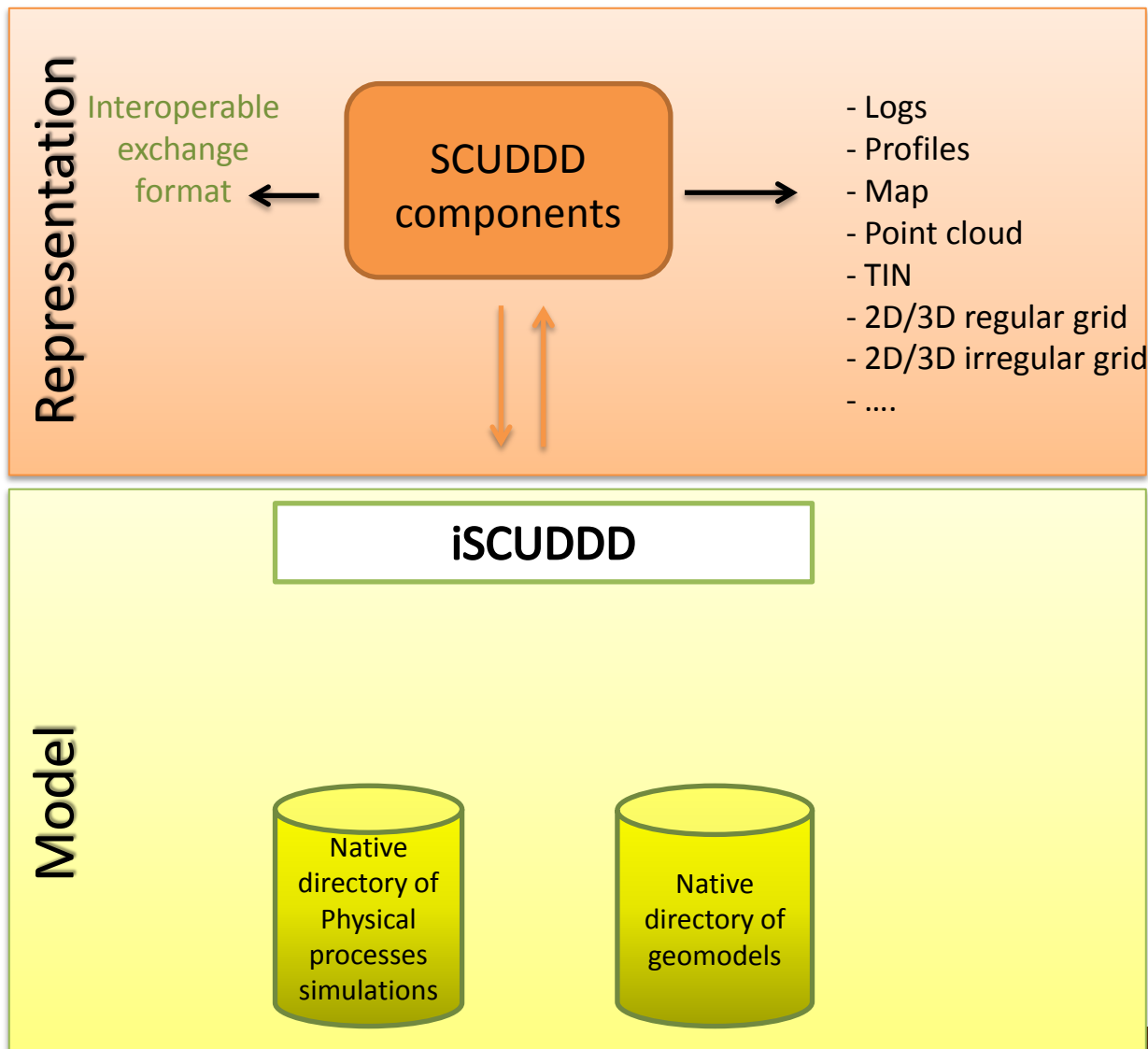
Interoperable programming interface : iScudd

iSCUDDD = Model queries / responses :

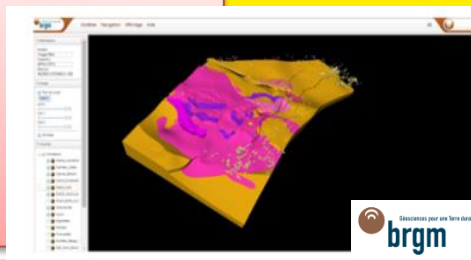
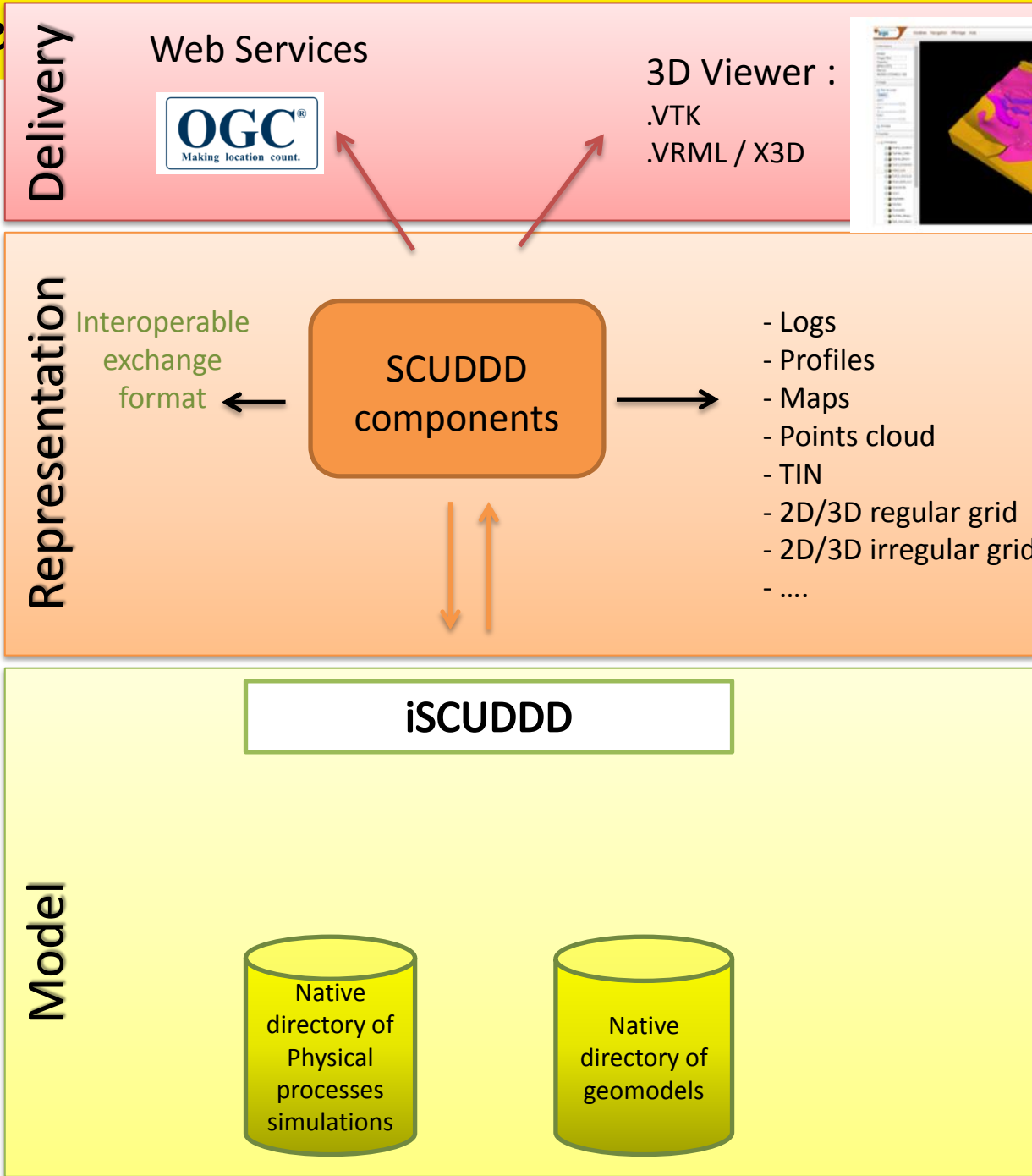
- 1) which formation
- 2) which contact



Interoperable programming interface : iScuddd

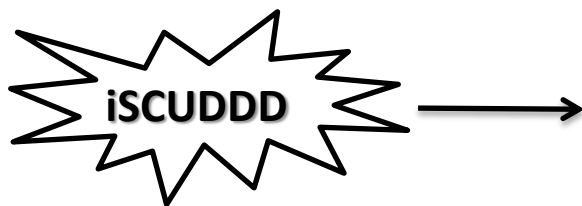


Interoperable

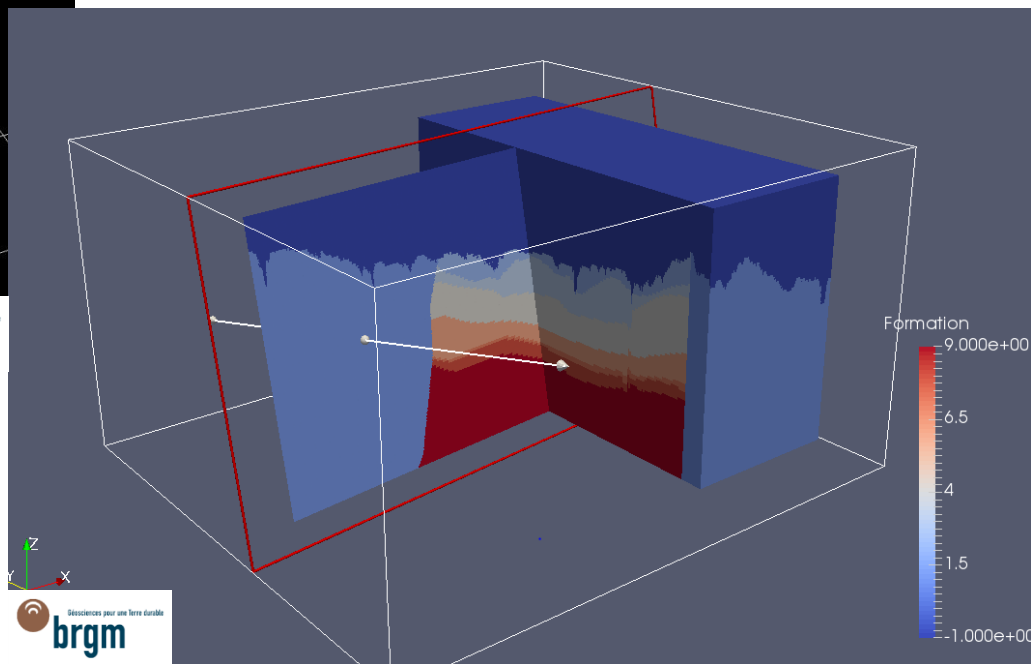
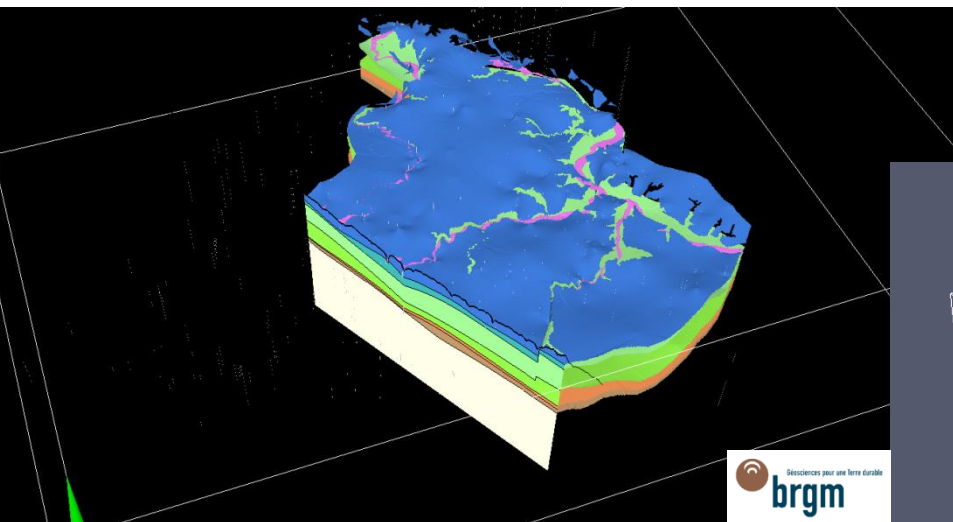


Example: from 2,5D model to 3D representation

GDM-MLY model:
Avre model.mly



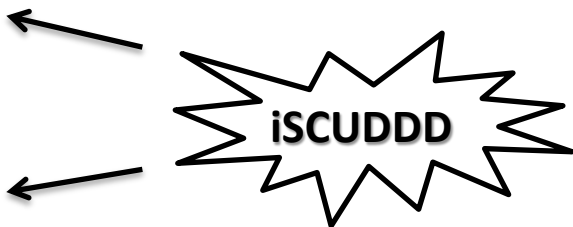
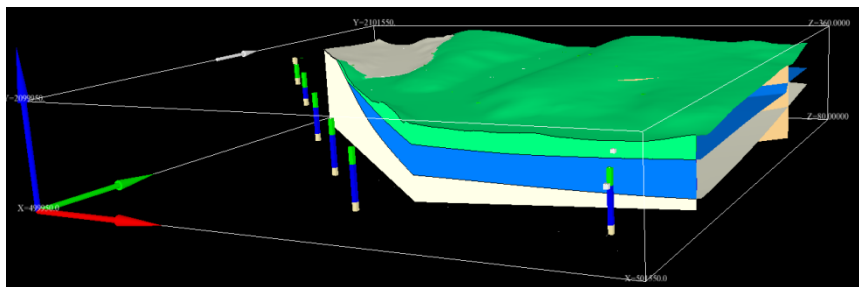
Avre_volume.vtk



Example: application on combined models

Model SansAllu.mly

Depth (M)	Formation	Formation	SurfaceType
	CRET		
34.10		JURA	ONLAP
34.80			ONLAP
		SUBS	
184.17			



GeologyLogs

Web services

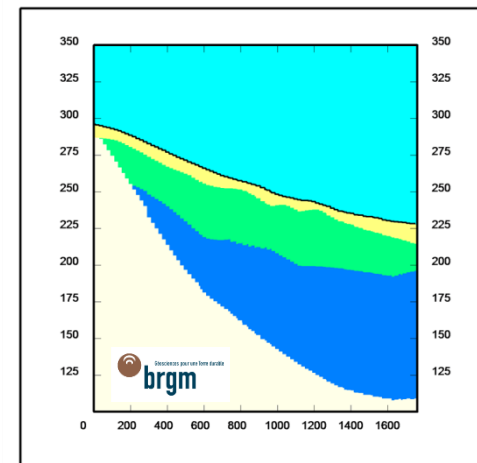
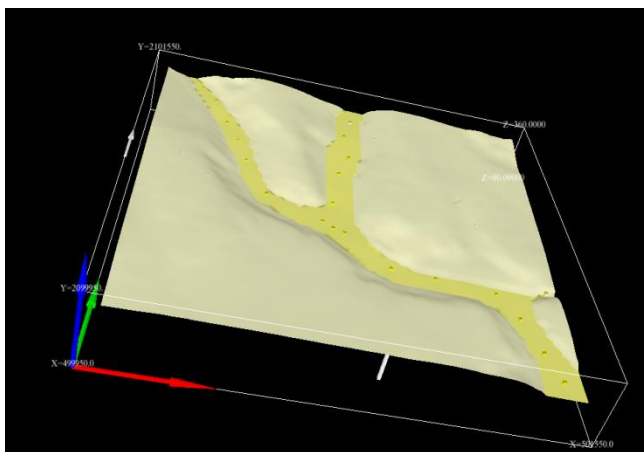
GeologyCrossSection

Depth (M)	Formation	Formation
7.99	ALLU	
	CRET	
34.10		JURA
34.80		
		SUBS
184.17		



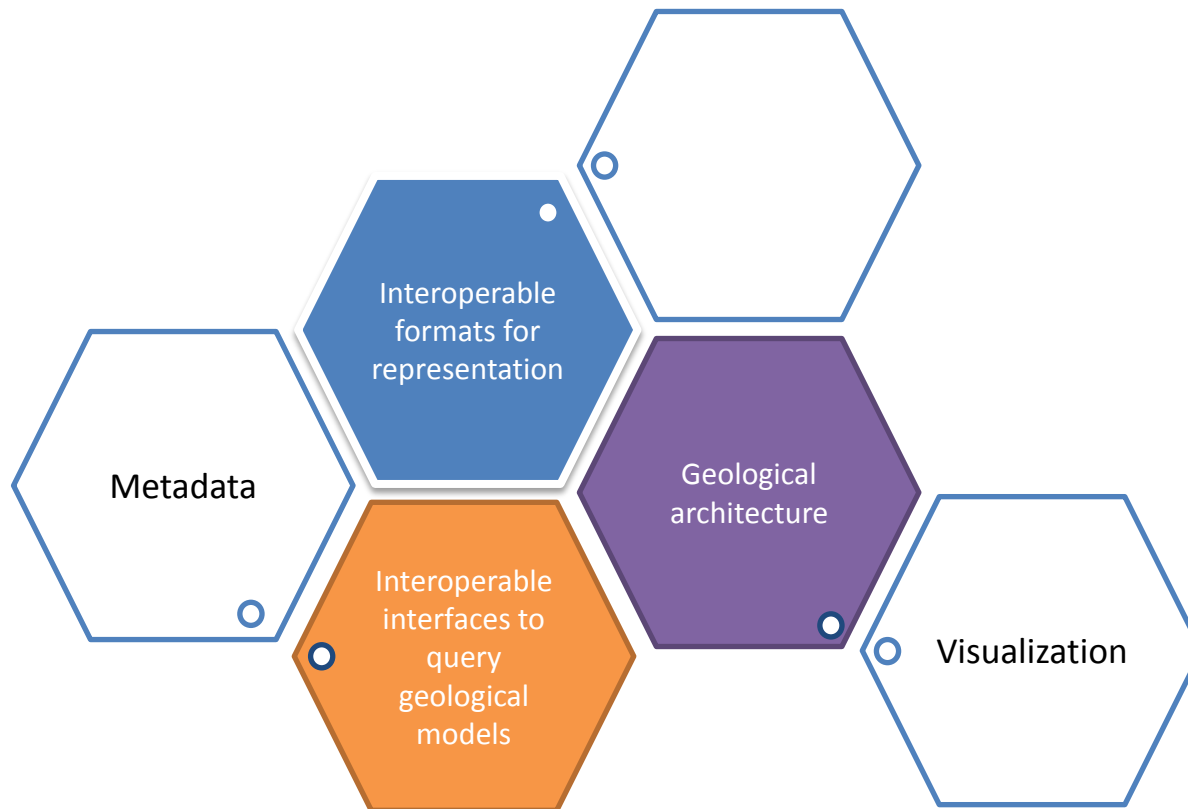
Model Allu.mly

Depth (M)	Formation	Formation	SurfaceType
7.99	ALLU		EROD
		SUBS	
75.84			

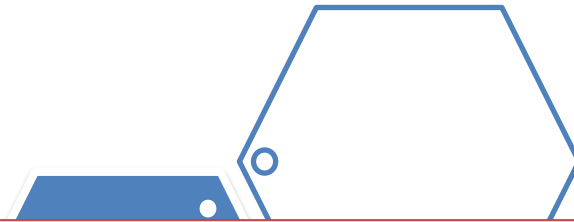


Conclusion & perspectives

SCUDDD : no data interoperability but iScuddd is an interoperable programming interface if and only if geomodel implements iScuddd



SCUDDD : no data interoperability but iScuddd is an interoperable programming interface if and only if geomodel implements iScuddd



Thank you for your attention

and

hope to see you at the **3D geoscience, borehole ad hoc meeting at the Dublin OGC/TC meeting next Wednesday 22 June**

geological
models