Esperienza in Geological Data Harmonisation

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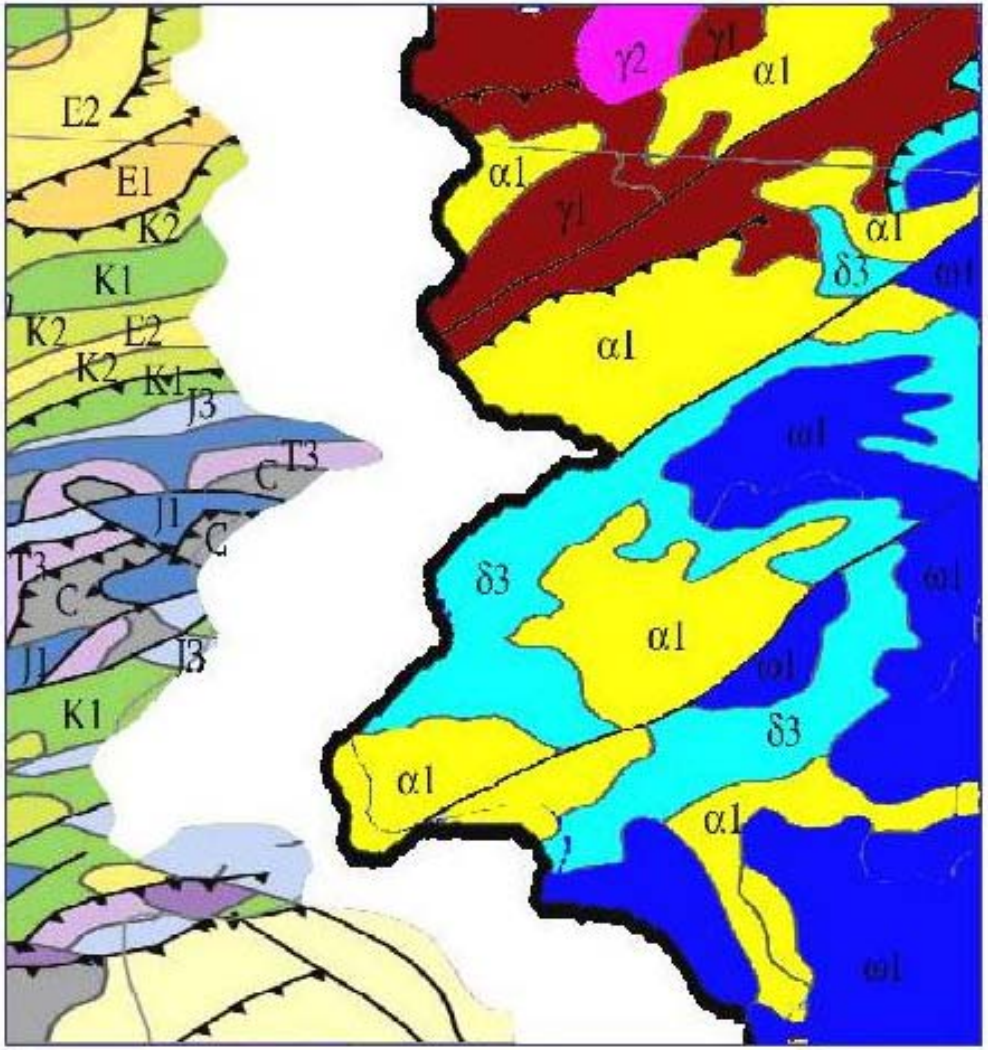
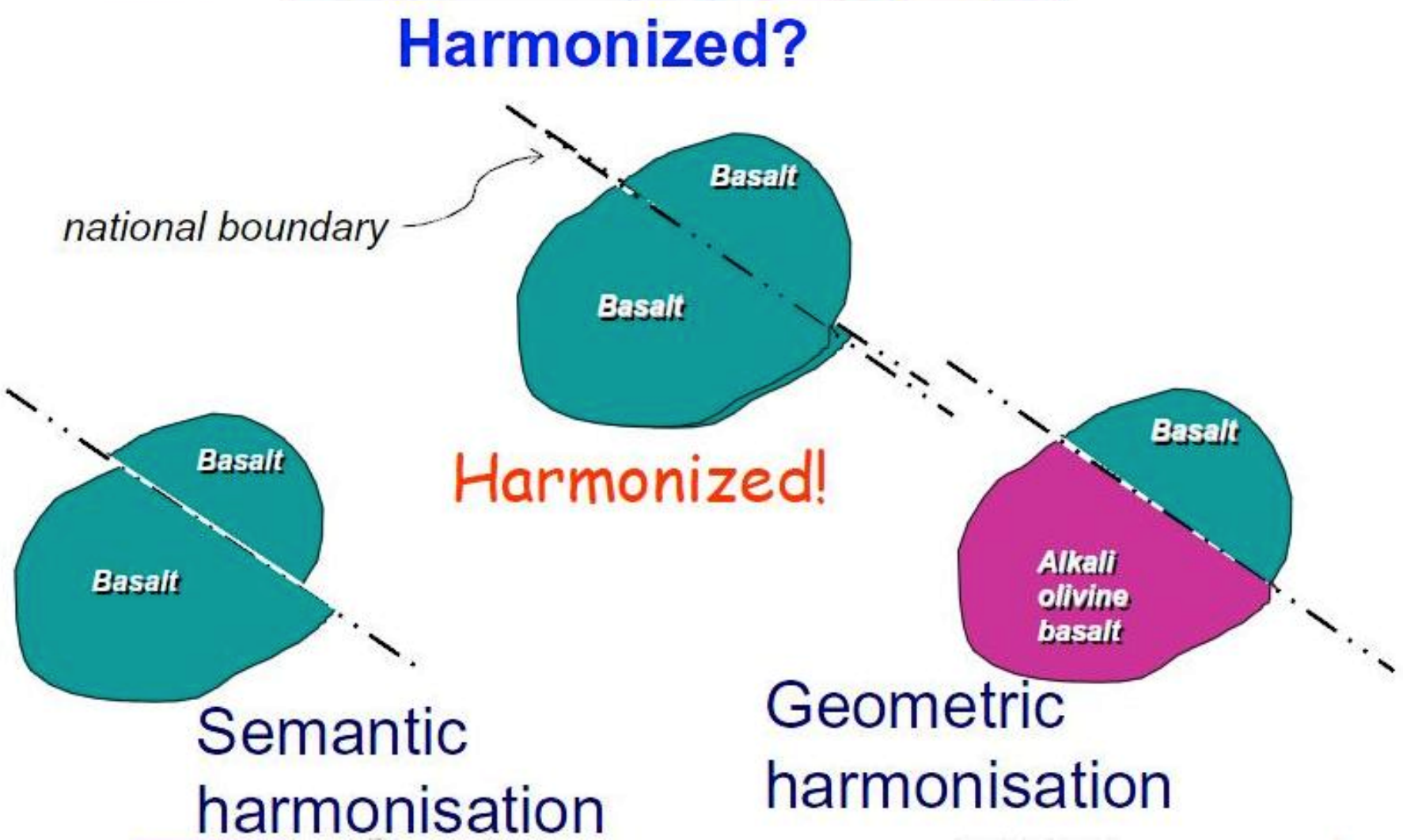
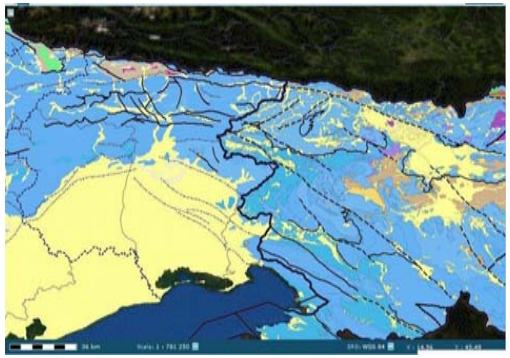
Perché armonizzare la geologia?



Perché armonizzare la geologia?



Partendo dall'esperienza di OneGeology- Europe



- Dataset OneGeology-Europe Carta Geologica 1:1M
- Valutazione delle anomalie litostratigrafiche
- Risoluzione dei problemi di armonizzazione geologica
- Uso dei vocabolari 1GE per l'armonizzazione semantica
- Mappatura verso GE INSPIRE data model

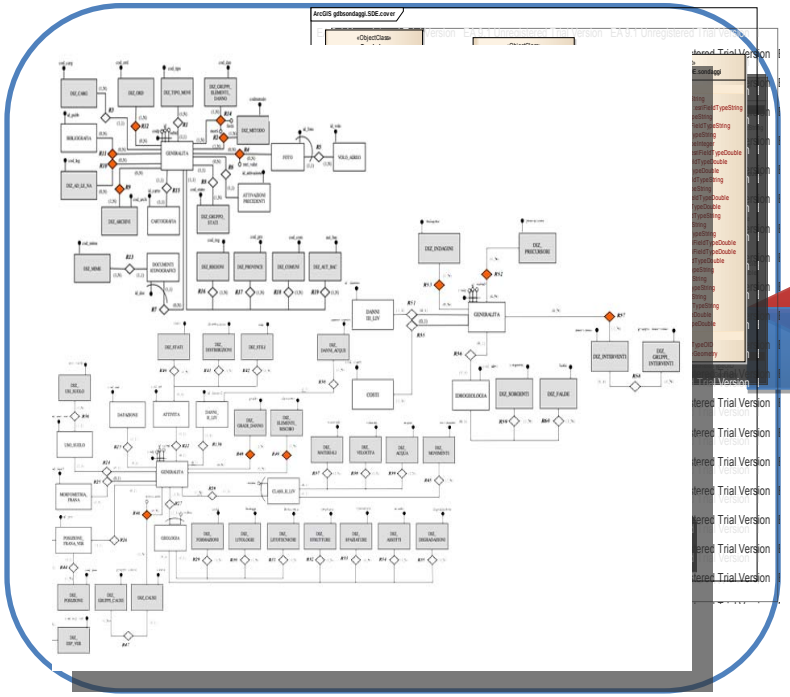
Armonizzazione

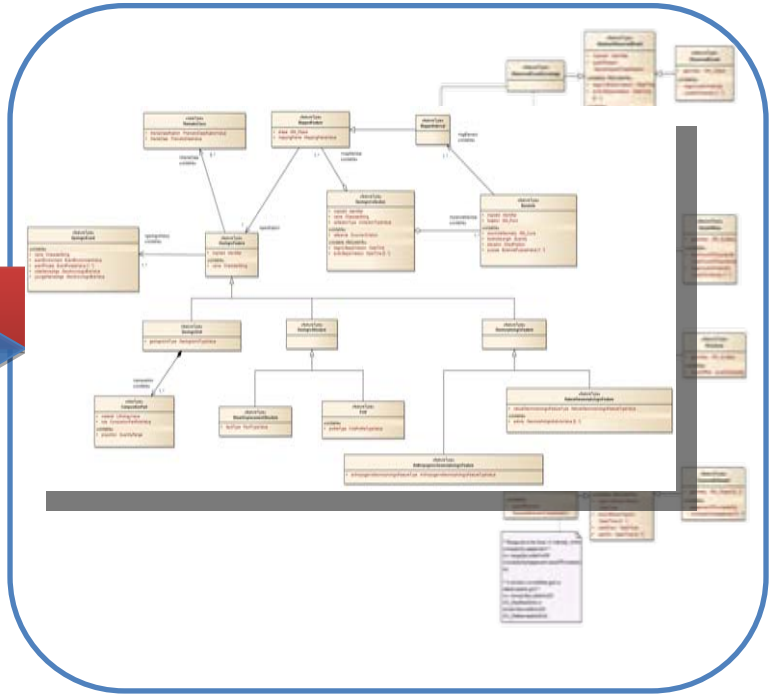
Usando l'approccio di OneGeology- Europe

- Dataset Carta Geologica 1:100k
- Valutazione delle anomalie litologiche + crnostratigrafiche e dei contatti
- Risoluzione problemi semantici e se possibile geometrici
- Utilizzo dei vocabolari ad hoc CGI-IUGS
- Mappatura verso il modello GeoSciML 3.2 (estensione INSPIRE)

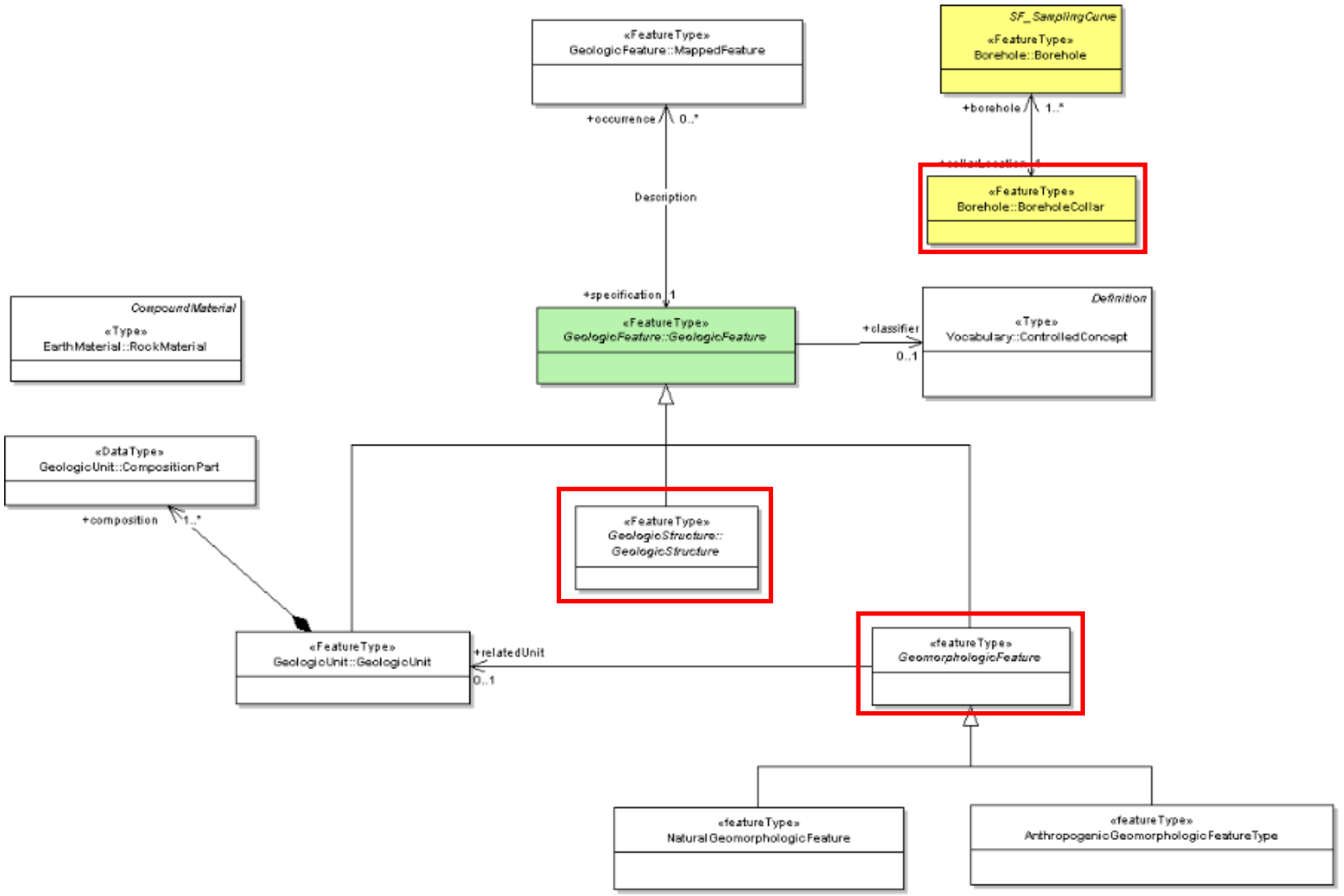
Mappatura – Fase 1 confronto modelli

Si ricorda che l'armonizzazione dei modelli dati e della semantica rappresenta l'azione primaria per poter avere sistemi integrati capaci di gestire e eseguire analisi ambientali e di pericolosità

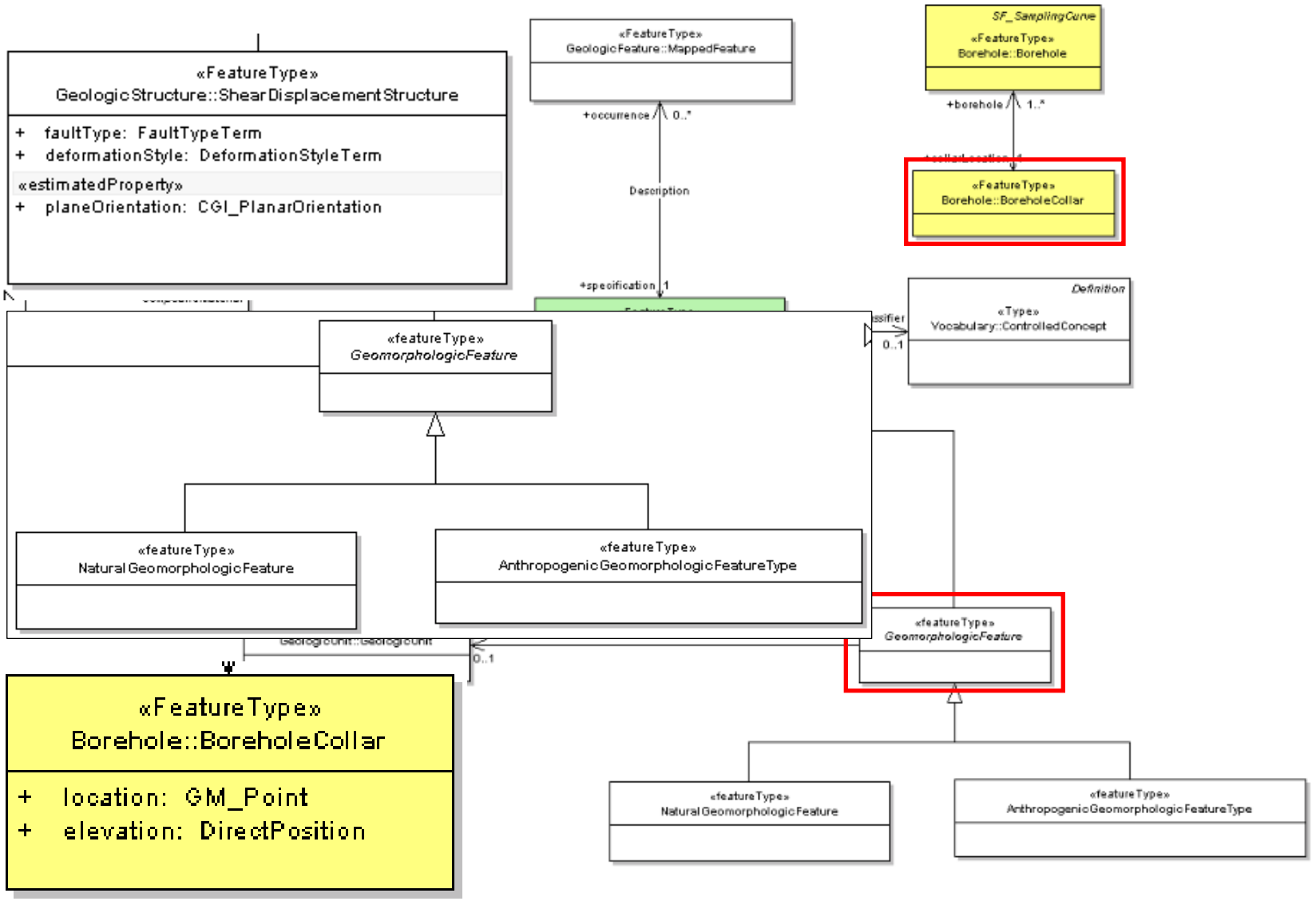




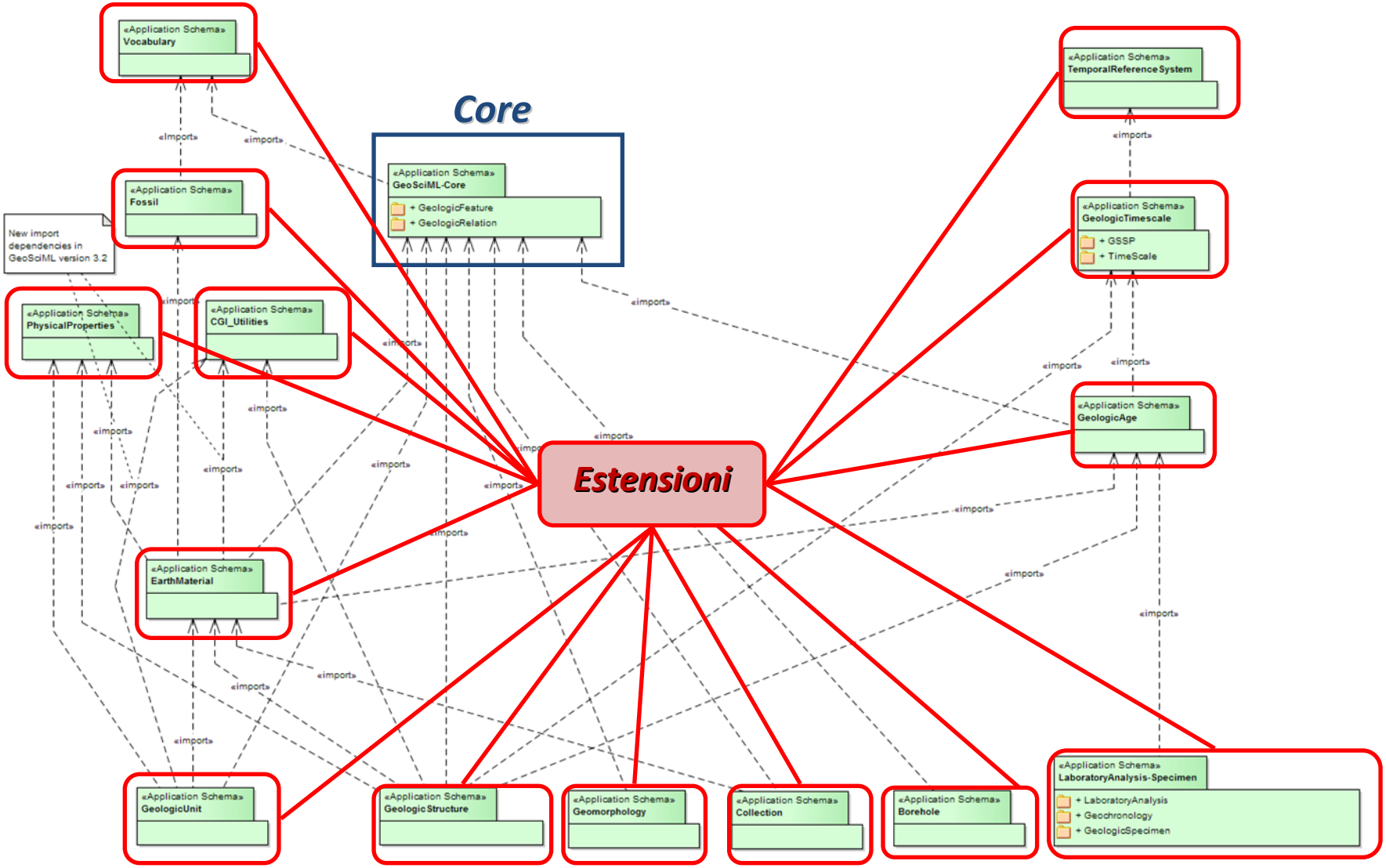
GE INSPIRE Data Model



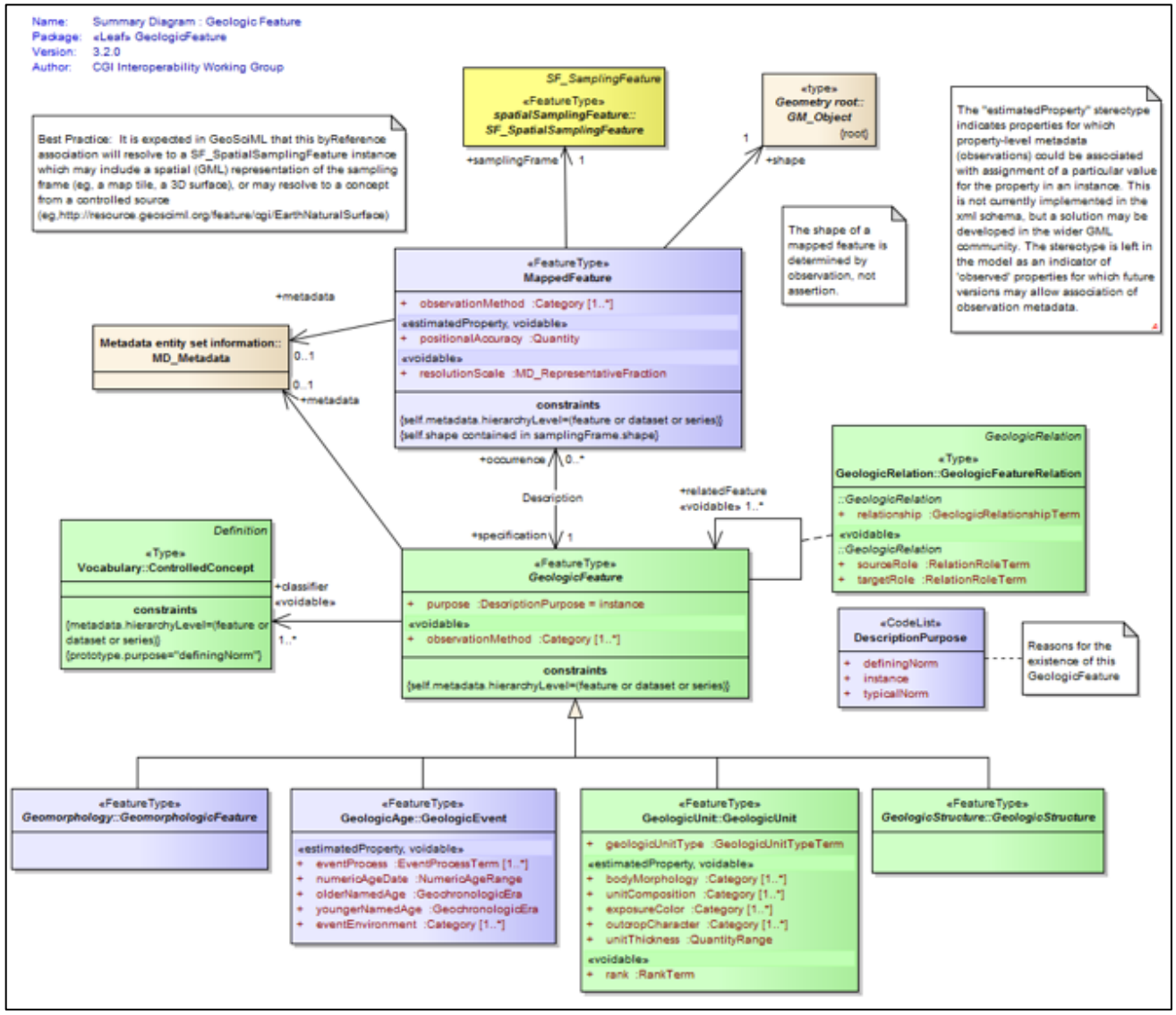
GE INSPIRE Data Model



GeoSciML Data Model



GeoSciML-Core Data Model



Mappatura – 1 Fase confronto modelli

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Application Schema 'GeologyCore' (version 3.0rc3)												Application Schema <G
2	Type	Documentation	Attribute|Association role|Constraint	Attribute / Association role / Constraint documentation	Values / Enumerations	Multiplicity	Voidable / Non-Voidable		Type	Documentation	Attribute|Association role|Constraint	Attribute / Association role / Constraint documentation	Values / Enumeration
3	GeologicUnit || Supertypes: IGeologicFeature| MappedFeature	A volume of rock with distinct characteristics	GeologicFeature	A conceptual geologic feature that ir	featureType				Geo1MDB/ONEGE	Geologic model at the scale 1:1,000,000 partially modified by OneGeology-Europe project to match GeoSciML and maybe INSPIRE GE.	ObjectID	identifier	Feature object
4			GeologicUnitId	Object identifier	Identifier|	1				ID_GEOLOG	Feature identifier	Identifier
5			shape	The geometry of the mapped feature.	GM_Object|	1				shape	The geometry of the polygon feature.	GM_Object|
6			inspireId	External object identifier of the spatial object. ||NOTE An	Identifier|	1				ID_GEOLOG	DB name + inspire (string) + Geologic Feature identifier	Identifier
7			beginLifespanVersion	Date and time at which this version of the spatial object	DateTime|	1	voidable			not present	set as constant in the xslt mapping file	DateTime
8			endLifespanVersion	Date and time at which this version of the spatial object	DateTime|	1	voidable			not present	set as constant in the xslt mapping file	DateTime
9			Name	The name of Geologic Unit	CharacterString	1	voidable				ID_GEOLOG	DB name + Geologic Feature identifier	string
10			gml:description	The geologic unit description; mainly the	CharacterString	0..1					DESCRIPTION	The geologic element description	string
11			geologicHistory	An association that relates one or more geologic events to a geologic feature to	GeologicEvent|	1..*	voidable			AGE TABLE	represents the link between geologic feature element and the age attribute if are	Link
12			geologicUnitType	Terms describing the type of geologic unit.	ValueOfCGI_Term	1	voidable			not present	In this database all the feature represent the same	CGI_Term	
13			composition	Describes the composition of the geologic unit.	CompositionPart	1..*	voidable				LITHOLOGY TABLE	represents the link between geologic feature element and the lithology attribute	Link
14			mappingFrame	The surface on which the mapped feature is projected.	ValueOfCode_List	1					not present	In this database all the feature represent the same mapped frame	Name Ontology
16	geologicHistory || Supertypes: IGeologicUnit| MappedFeature	An association that relates one or more geologic events to a geologic feature to describe their age or geologic history.	GeologicEvent	An identifiable event during which one or more	featureType				Geo1MDB/ONEGE	Geologic model at the scale 1:1,000,000 partially modified by OneGeology-Europe project to match GeoSciML and maybe INSPIRE GE.	AGE TABLE	AGE AND EVENT ATTRIBUTE PART	
17			GeologicEventID	Object identifier	Identifier|	1				ID_GEOLOG	Feature identifier	Identifier
18			Name	The Name of Geologic	CharacterString/CGI_Ter	1	voidable				not present	string or CGI_Term	CGI_Term
19			olderNamedAge	Older boundary of the age	ValueOfCGI_Term	1	voidable				URN_AGE_L	CGI_TERM URI	CGI_Term
20			youngerNamedAge	Younger boundary of the	ValueOfCGI_Term	1	voidable				URN_AGE_U	CGI_TERM URI	CGI_Term

Mappatura – Fase 2 confronto semantico

International Chronostratigraphic Chart (2013)
http://resource.geosciml.org/vocabulary/cgi/201211/ + timescale/isc-2013.rdf

CGI Simple Lithology Categories
+ SimpleLithology201211.rdf

CGI compound Material Constituent Part Role vocabulary
+ CompoundMaterialConstituentPartRole201211.rdf

CGI Proportion Term Vocabulary
+ ProportionTerm201211.rdf

CGI Event Environment CategorieS
+ EventEnvironment201211.rdf

CGI Event Process Categories
+ EventProcess201211.rdf

CGI Geologic unit type vocabulary
+ GeologicUnitType201211.rdf

CGI Consolidation Degree Term Vocabulary
+ ConsolidationDegree201211.rdf

CGI Foliation Type categories
+ FoliationType201211.rdf

Vocabolari IUGS-CGI

Armonizzazione

Elenco di codici

Elementi per pagina 50

Etichetta	Categoria tematica	Geologia	Elemento padre	Stato
Etichetta	**Categoria tematica**	**Schema di applicazione**	**Elemento padre**	**Stato**
Ambiente di un evento	Geologia	Geologia		Valido
Attività geomorfologica	Geologia	Geologia		Valido
Classe tematica	Geologia	Geologia		Valido
Classificazione tematica	Geologia	Geologia		Valido
Condizione dell'acqua sotterranea	Geologia	Idrogeologia		Valido
Era geocronologica	Geologia	Geologia		Valido
Fotogramma di mappatura	Geologia	Geologia		Valido
Litologia	Geologia	Geologia		Valido
Persistenza dell'acqua	Geologia	Idrogeologia		Valido
Processo durante un evento	Geologia	Geologia		Valido
Ruoli delle parti della composizione	Geologia	Geologia		Valido
Salinità dell'acqua	Geologia	Idrogeologia		Valido
Scopi del foro	Geologia	Geologia		Valido
Tipo di codici di stato	Geologia	Idrogeologia		Valido
Tipo di elemento geomorfologico antropogenico	Geologia	Geologia		Valido
Tipo di elemento geomorfologico naturale	Geologia	Geologia		Valido
Tipo di faglia	Geologia	Geologia		Valido
Tipo di falda acquifera	Geologia	Idrogeologia		Valido
Tipo di mezzi della falda acquifera	Geologia	Idrogeologia		Valido
Tipo di oggetto naturale	Geologia	Idrogeologia		Valido
Tipo di pozzo attivo	Geologia	Idrogeologia		Valido

INSPIRE Code-list

Armonizzazione

Geolitho100k_GSML_FVG_ID_LITHO1_20150723

CHIAVE ULF	NOME ULF	ETA GEOL	ETA INF	ETA SUP	LITOLOGIA	COD LITO	CLASSI LIT	
004C048	arenarie di val gardena	permiano medio	permiano medio	permiano medio	arenarie	A9	arenarie, arenarie + conglomerati, arenarie + sabbie	Rocc
004C058	calcari reticolati grigi	carbonifero inferiore - devoniano superiore	carbonifero inf	devoniano superi	calcari	A1	calcilutiti, calcareniti,calciruditi; calcari dolomitici, calcari selcifer	Rocc
004C004	detrito di falda	N.D.	attuale	attuale	terreni a granulometria mista	B4	terreni a granulometria mista (f+m+g)	Cope
004C048	arenarie di val gardena	permiano medio	permiano medio	permiano medio	arenarie	A9	arenarie, arenarie + conglomerati, arenarie + sabbie	Rocc
004C043	formazione di werfen	scitico	scitico	scitico	complessi calcareo-arenacei	A11	complesso calcareo (dolomitico) - arenaceo, calcareo (dolomiti	Rocc
004C006	detrito di falda misto a sfasciume morenico	N.D.	olocene	olocene	terreni a granulometria mista	B4	terreni a granulometria mista (f+m+g)	Cope
004C061	calcari pelagici mandorlati o nodulari rossi	devoniano medio - inferiore	devoniano infer	devoniano medio	calcari	A1	calcilutiti, calcareniti,calciruditi; calcari dolomitici, calcari selcifer	Rocc
004C045	formazione a bellerophon	permiano superiore	permiano super	permiano superio	complessi calcareo-arenacei	A11	complesso calcareo (dolomitico) - arenaceo, calcareo (dolomiti	Rocc
004C057	formazione dell'hochwipfel	carbonifero medio e inferiore	carbonifero inf	carbonifero medi	complessi pelitico-arenacei	A10	complesso pelitico-arenaceo, pelitico-arenaceo-conglomeratico	Rocc
004C006	detrito di falda misto a sfasciume morenico	N.D.	olocene	olocene	terreni a granulometria mista	B4	terreni a granulometria mista (f+m+g)	Cope
004C004	detrito di falda	N.D.	attuale	attuale	terreni a granulometria mista	B4	terreni a granulometria mista (f+m+g)	Cope
004C038	dolomia del serla	ladinico - anisico	anisico	ladinico	dolomie	A2	dolomie, dolomie calcaree	Rocc
004C057	formazione dell'hochwipfel	carbonifero medio e inferiore	carbonifero inf	carbonifero medi	complessi pelitico-arenacei	A10	complesso pelitico-arenaceo, pelitico-arenaceo-conglomeratico	Rocc
999						NN		Rocc
004C057	formazione dell'hochwipfel	carbonifero medio e inferiore	carbonifero inf	carbonifero medi	complessi pelitico-arenacei	A10	complesso pelitico-arenaceo, pelitico-arenaceo-conglomeratico	Rocc
004C061	calcari pelagici mandorlati o nodulari rossi	devoniano medio - inferiore	devoniano infer	devoniano medio	calcari	A1	calcilutiti, calcareniti,calciruditi; calcari dolomitici, calcari selcifer	Rocc
004C057	formazione dell'hochwipfel	carbonifero medio e inferiore	carbonifero inf	carbonifero medi	complessi pelitico-arenacei	A10	complesso pelitico-arenaceo, pelitico-arenaceo-conglomeratico	Rocc
004C043	formazione di werfen	scitico	scitico	scitico	complessi calcareo-arenacei	A11	complesso calcareo (dolomitico) - arenaceo, calcareo (dolomiti	Rocc
004C057	formazione dell'hochwipfel	carbonifero medio e inferiore	carbonifero inf	carbonifero medi	complessi pelitico-arenacei	A10	complesso pelitico-arenaceo, pelitico-arenaceo-conglomeratico	Rocc
004C060	calciruditi e calcari di "scogliera" grigio-chiari	devoniano superiore - devoniano inferiore	devoniano infer	devoniano superi	calcari	A1	calcilutiti, calcareniti,calciruditi; calcari dolomitici, calcari selcifer	Rocc
004C004	detrito di falda	N.D.	attuale	attuale	terreni a granulometria mista	B4	terreni a granulometria mista (f+m+g)	Cope
004C060	calciruditi e calcari di "scogliera" grigio-chiari	devoniano superiore - devoniano inferiore	devoniano infer	devoniano superi	calcari	A1	calcilutiti, calcareniti,calciruditi; calcari dolomitici, calcari selcifer	Rocc
004C006	detrito di falda misto a sfasciume morenico	N.D.	olocene	olocene	terreni a granulometria mista	B4	terreni a granulometria mista (f+m+g)	Cope
004C059	calcari di "scogliera" listati	devoniano	devoniano	devoniano	calcari	A1	calcilutiti, calcareniti,calciruditi; calcari dolomitici, calcari selcifer	Rocc
004C058	calcari reticolati grigi	carbonifero inferiore - devoniano superiore	carbonifero inf	devoniano superi	calcari	A1	calcilutiti, calcareniti,calciruditi; calcari dolomitici, calcari selcifer	Rocc
999						NN		Rocc
004C060	calciruditi e calcari di "scogliera" grigio-chiari	devoniano superiore - devoniano inferiore	devoniano infer	devoniano superi	calcari	A1	calcilutiti, calcareniti,calciruditi; calcari dolomitici, calcari selcifer	Rocc
004C060	calciruditi e calcari di "scogliera" grigio-chiari	devoniano superiore - devoniano inferiore	devoniano infer	devoniano superi	calcari	A1	calcilutiti, calcareniti,calciruditi; calcari dolomitici, calcari selcifer	Rocc
004C058	calcari reticolati grigi	carbonifero inferiore - devoniano superiore	carbonifero inf	devoniano superi	calcari	A1	calcilutiti, calcareniti,calciruditi; calcari dolomitici, calcari selcifer	Rocc
004C060	calciruditi e calcari di "scogliera" grigio-chiari	devoniano superiore - devoniano inferiore	devoniano infer	devoniano superi	calcari	A1	calcilutiti, calcareniti,calciruditi; calcari dolomitici, calcari selcifer	Rocc
004C012	depositi morenici prevalentemente grossolani e	N.D.	olocene	olocene	terreni a granulometria mista	B4	terreni a granulometria mista (f+m+g)	Cope
004C058	calcari reticolati grigi	carbonifero inferiore - devoniano superiore	carbonifero inf	devoniano superi	calcari	A1	calcilutiti, calcareniti,calciruditi; calcari dolomitici, calcari selcifer	Rocc
004C057	formazione dell'hochwipfel	carbonifero medio e inferiore	carbonifero inf	carbonifero medi	complessi pelitico-arenacei	A10	complesso pelitico-arenaceo, pelitico-arenaceo-conglomeratico	Rocc
004C055	diabasi spesso spilitici	carbonifero medio	carbonifero me	carbonifero medi	Lave basichei	D3	basalti; trachibasalti; picrobasalti; picrite; tefriti; basaniti; fonotef	Rocc
004C004	detrito di falda	N.D.	attuale	attuale	terreni a granulometria mista	B4	terreni a granulometria mista (f+m+g)	Cope
004C060	calciruditi e calcari di "scogliera" grigio-chiari	devoniano superiore - devoniano inferiore	devoniano infer	devoniano superi	calcari	A1	calcilutiti, calcareniti,calciruditi; calcari dolomitici, calcari selcifer	Rocc

1 (0 out of 5482 Selected)

arenarie di val gardena	permiano medio		permiano medio	permiano medio	arenarie
formazione di werfen	scitico		scitico	scitico	complessi calcareo-arenacei

Armonizzazione

Geolitho100k_GSML_FVG_ID_LITHO1_20150723

CHIAVE_U	OLDER_AGE	YOUNG_AGE	LITHOLOGY1	LITHOLOGY2	LITHOLOGY3	EVENT_ENVI	EVENT_PROC	FOLIATION	CONSOLIDAT
004C048	Permian	Permian	Sandstone	Siltstone	Claystone	Meandering river channel setting	Deposition from moving fluid	Parallel bedding lamination	Consolidated
004C058	upper_devonian	Carboniferous	Limestone			Marine carbonate platform setting	Biological precipitation	Sedimentary layering	Well indurated
004C004	holocene	Holocene	Clastic sediment			Hillslope setting	Mechanical deposition		Unconsolidated
004C048	Permian	Permian	Sandstone	Siltstone	Claystone	Meandering river channel setting	Deposition from moving fluid	Parallel bedding lamination	Consolidated
004C043	changhsingian	Olenekian	Impure limestone	Sandstone	Siltstone	Tidal setting	Mechanical deposition	Parallel bedding lamination	Well indurated
004C006	holocene	Holocene	Clastic sediment			Hillslope setting	Mechanical deposition		Unconsolidated
004C061	lower_devonian	Middle Devonian	Limestone	Impure limestone		Basin plain setting	Biological precipitation	Sedimentary layering	Well indurated
004C045	lopingian	Lopingian	Limestone	Carbonate sedimentary	Impure dolomite	Tidal setting	Chemical precipitation	Sedimentary layering	Well indurated
004C057	Visean	Bashkirian	Claystone	Siltstone	Wacke	Slope-rise setting	Turbidity current deposition	Sedimentary layering	Well indurated
004C006	holocene	Holocene	Clastic sediment			Hillslope setting	Mechanical deposition		Unconsolidated
004C004	holocene	Holocene	Clastic sediment			Hillslope setting	Mechanical deposition		Unconsolidated
004C038	anisian	Ladinian	Dolomite	Limestone	Impure limestone	Marine carbonate platform setting	Chemical precipitation		Well indurated
004C057	Visean	Bashkirian	Claystone	Siltstone	Wacke	Slope-rise setting	Turbidity current deposition	Sedimentary layering	Well indurated
999	holocene	Holocene	Clastic sediment			Hillslope setting	Mechanical deposition	Grain shape foliation	Unconsolidated
004C057	Visean	Bashkirian	Claystone	Siltstone	Wacke	Slope-rise setting	Turbidity current deposition	Sedimentary layering	Well indurated
004C061	lower_devonian	Middle Devonian	Limestone	Impure limestone		Basin plain setting	Biological precipitation	Sedimentary layering	Well indurated
004C057	Visean	Bashkirian	Claystone	Siltstone	Wacke	Slope-rise setting	Turbidity current deposition	Sedimentary layering	Well indurated
004C043	changhsingian	Olenekian	Impure limestone	Sandstone	Siltstone	Tidal setting	Mechanical deposition	Parallel bedding lamination	Well indurated
004C057	Visean	Bashkirian	Claystone	Siltstone	Wacke	Slope-rise setting	Turbidity current deposition	Sedimentary layering	Well indurated
004C060	lower_devonian	Late/Upper Devonian	Carbonate sedimentary rock	Grainstone		Forereef setting	Biological precipitation	Sedimentary layering	Well indurated
004C004	holocene	Holocene	Clastic sediment			Hillslope setting	Mechanical deposition		Unconsolidated
004C060	lower_devonian	Late/Upper Devonian	Carbonate sedimentary rock	Grainstone		Forereef setting	Biological precipitation	Sedimentary layering	Well indurated
004C006	holocene	Holocene	Clastic sediment			Hillslope setting	Mechanical deposition		Unconsolidated
004C059	devonian	Devonian	Limestone	Carbonate sedimentary	Framestone	Forereef setting	Biological precipitation	Parallel bedding lamination	Well indurated
004C058	upper_devonian	Carboniferous	Limestone			Marine carbonate platform setting	Biological precipitation	Sedimentary layering	Well indurated
999	holocene	Holocene	Clastic sediment			Hillslope setting	Mechanical deposition	Grain shape foliation	Unconsolidated
004C060	lower_devonian	Late/Upper Devonian	Carbonate sedimentary rock	Grainstone		Forereef setting	Biological precipitation	Sedimentary layering	Well indurated
004C060	lower_devonian	Late/Upper Devonian	Carbonate sedimentary rock	Grainstone		Forereef setting	Biological precipitation	Sedimentary layering	Well indurated
004C058	upper_devonian	Carboniferous	Limestone			Marine carbonate platform setting	Biological precipitation	Sedimentary layering	Well indurated
004C060	lower_devonian	Late/Upper Devonian	Carbonate sedimentary rock	Grainstone		Forereef setting	Biological precipitation	Sedimentary layering	Well indurated
004C012	holocene	Holocene	Clastic sediment			Subglacial setting	Ice erosion		Unconsolidated
004C058	upper_devonian	Carboniferous	Limestone			Marine carbonate platform setting	Biological precipitation	Sedimentary layering	Well indurated
004C057	Visean	Bashkirian	Claystone	Siltstone	Wacke	Slope-rise setting	Turbidity current deposition	Sedimentary layering	Well indurated
004C055	carboniferous	Carboniferous	Spilite	Basic igneous rock		Continental rift setting	Rifting		Well indurated
004C004	holocene	Holocene	Clastic sediment			Hillslope setting	Mechanical deposition		Unconsolidated

0 (0 out of 5482 Selected)

holocene	Holocene	Clastic sediment			Hillslope setting	Mechanical deposition
Permian	Permian	Sandstone	Siltstone	Claystone	Meandering river channel setting	Deposition from moving fluid

http://resource.geosciml.org/classifier/ics/ischart/Holocene

Mappatura – Fase 3 erogazione servizi


```
- <wfs:FeatureCollection xsi:schemaLocation="http://inspire.ec.europa.eu/schemas/ge-core/3.0/ http://inspire.ec.europa.eu/schemas/ge-core/3.0/GeologyCore.xsd">
  - <wfs:featureMember>
    - <ge:MappedFeature gml:id="FeatureID1">
        <gml:identifier codeSpace="http://sgi.isprambiente.it/geodata/">Geo1MDB</gml:identifier>
      + <ge:shape></ge:shape>
        <ge:mappingFrame xlink:href="http://sweet.jpl.nasa.gov/ontology/earthrealm.owl#LandSurface"/>
        <!-- Geological part -->
      - <ge:specification>
        - <ge:GeologicUnit gml:id="GU_1">
          - <ge:inspireId>
            - <base:Identifier>
                <base:localId>InspireID_1</base:localId>
                <base:namespace>ISPRASGI_Geo</base:namespace>
              </base:Identifier>
            </ge:inspireId>
            <ge:name>Geo1MDB_G_1</ge:name>
          - <ge:geologicHistory>
            - <ge:GeologicEvent gml:id="EventID_1">
              - <ge:name>
                  Def: Deltaic, alluvial and coastal plain deposits; aeolian deposits
                </ge:name>
                <ge:eventEnvironment xlink:href="http://resource.geosciml.org/classifier/cgi/eventenvironment/deltaic_system_setting" xlink:title="deltaic_system_setting"/>
                <ge:eventProcess nilReason="missing" xsi:nil="true"/>
                <ge:olderNamedAge xlink:href="urn:cgi:classifier:ICS:StratChart:200908:Holocene" xlink:title="urn:cgi:classifier:ICS:StratChart:200908:Holocene"/>
                <ge:youngerNamedAge xlink:href="urn:cgi:classifier:ICS:StratChart:200908:Holocene" xlink:title="urn:cgi:classifier:ICS:StratChart:200908:Holocene"/>
              </ge:GeologicEvent>
            </ge:geologicHistory>
            <ge:geologicUnitType xlink:href="http://resource.geosciml.org/classifier/cgi/geologicunittype/lithostratigraphic_unit" xlink:title="Lithostratigraphic_unit"/>
          - <ge:composition>
            - <ge:CompositionPart>
                <ge:material xlink:title="urn:cgi:classifier:CGI:SimpleLithology:201001:clastic_sediment"
                xlink:href="urn:cgi:classifier:CGI:SimpleLithology:201001:clastic_sediment"/>
```

Mappatura – Fase 3 erogazione servizi

```
- <wfs:FeatureCollection xsi:schemaLocation="http://inspire.ec.europa.eu/schemas/ge-core/3.0/ http://inspire.ec.europa.eu/schemas/ge-core/3.0/GeologyCore.xsd">
  - <wfs:featureMember>
    - <ge:MappedFeature gml:id="FeatureID1">
        <gml:identifier codeSpace="http://sgi.isprambiente.it/geodata/">Geo1MDB</gml:identifier>
      + <ge:shape></ge:shape>
        <ge:mappingFrame xlink:href="http://sweet.jpl.nasa.gov/ontology/earthrealm.owl#LandSurface"/>
        <!-- Geological part -->
      - <ge:specification>
        - <ge:GeologicUnit gml:id="GU_1">

t xlink:href="http://resource.geosciml.org/classifier/cgi/eventenvironment/deltaic_system_setting" xlink:title="deltaic_system_setting"/>
eason="missing" xsi:nil="true"/>
link:href="urn:cgi:classifier:ICS:StratChart:200908:Holocene" xlink:title="urn:cgi:classifier:ICS:StratChart:200908:Holocene"/>
e xlink:href="urn:cgi:classifier:ICS:StratChart:200908:Holocene" xlink:title="urn:cgi:classifier:ICS:StratChart:200908:Holocene"/>

          - <ge:name>
              Def: Deltaic, alluvial and coastal plain deposits; aeolian deposits
            </ge:name>
            <ge:eventEnvironment xlink:href="http://resource.geosciml.org/classifier/cgi/eventenvironment/deltaic_system_setting" xlink:title="deltaic_system_setting"/>
            <ge:eventProcess nilReason="missing" xsi:nil="true"/>
            <ge:olderNamedAge xlink:href="urn:cgi:classifier:ICS:StratChart:200908:Holocene" xlink:title="urn:cgi:classifier:ICS:StratChart:200908:Holocene"/>
            <ge:youngerNamedAge xlink:href="urn:cgi:classifier:ICS:StratChart:200908:Holocene" xlink:title="urn:cgi:classifier:ICS:StratChart:200908:Holocene"/>
          </ge:GeologicEvent>
        </ge:geologicHistory>
        <ge:geologicUnitType xlink:href="http://resource.geosciml.org/classifier/cgi/geologicunittype/lithostratigraphic_unit" xlink:title="Lithostratigraphic_unit"/>
      - <ge:composition>
        - <ge:CompositionPart>
            <ge:material xlink:title="urn:cgi:classifier:CGI:SimpleLithology:201001:clastic_sediment"
            xlink:href="urn:cgi:classifier:CGI:SimpleLithology:201001:clastic_sediment"/>
```

Mappatura – Fase 3 erogazione servizi

sgi3.isprambiente.it/eenvplus/geo100k/?SERVICE=WFS&VERSION=1.1.0&REQUEST= Cerca

```
- <gsmlgu:GeologicUnit gml:id="GU_014A031">
    <gml:identifier codeSpace="#EVENT_1">Geo100_GU014A031</gml:identifier>
    <gml:name>calcare di lusnizza</gml:name>
    <gsml:observationMethod nilReason="missing" xsi:nil="true"/>
    <gsml:purpose>typicalNorm</gsml:purpose>
  + <gsml:relatedFeature></gsml:relatedFeature>
  - <gsml:relatedFeature>
    - <gsmlga:GeologicHistory gml:id="GU_EV_014A031">
        <gsml:relationship xlink:href="http://resource.geosciml.org/classifier/cgi/featurerelation/geologicfeaturegeneticevent"/>
        <gsml:sourceRole nilReason="missing" xsi:nil="true"/>
        <gsml:targetRole nilReason="missing" xsi:nil="true"/>
      - <gsml:relatedFeature>
        - <gsmlga:GeologicEvent gml:id="EV_0.0">
            <gml:name>Orogenesi alpina</gml:name>
            <gsml:observationMethod nilReason="missing" xsi:nil="true"/>
            <gsml:purpose>instance</gsml:purpose>
            <gsml:relatedFeature nilReason="missing" xsi:nil="true"/>
            <gsml:classifier nilReason="missing" xsi:nil="true"/>
            <gsml:metadata gco:nilReason="missing" xsi:nil="true"/>
            <gsmlga:eventProcess xlink:href="http://resource.geosciml.org/classifier/cgi/eventprocess/chemical_precipitation" xlink:title="chemical_precipitation"/>
            <gsmlga:numericAgeDate nilReason="missing" xsi:nil="true"/>
            <gsmlga:olderNamedAge xlink:href="http://resource.geosciml.org/classifier/ics/ischart/anisian" xlink:title="anisian"/>
            <gsmlga:youngerNamedAge xlink:href="http://resource.geosciml.org/classifier/ics/ischart/anisian" xlink:title="anisian"/>
          - <gsmlga:eventEnvironment>
            - <swe:Category definition="http://inspire.ec.europa.eu/codelist/EventEnvironmentValue">
              - <swe:extension>
                + <swe:Category definition="http://resource.geosciml.org/classifierscheme/cgi/201211/valuequalifier"></swe:Category>
                </swe:extension>
              - <swe:identifier>
                  http://resource.geosciml.org/classifier/cgi/eventenvironment/marine_carbonate_platform_setting
                </swe:identifier>
                <swe:label>marine_carbonate_platform_setting</swe:label>
                <swe:codeSpace xlink:href="http://resource.geosciml.org/classifier/cgi/eventenvironment"/>
              </swe:Category>
            </gsmlga:eventEnvironment>
            <gsmlga:prototype nilReason="missing" xsi:nil="true"/>
```

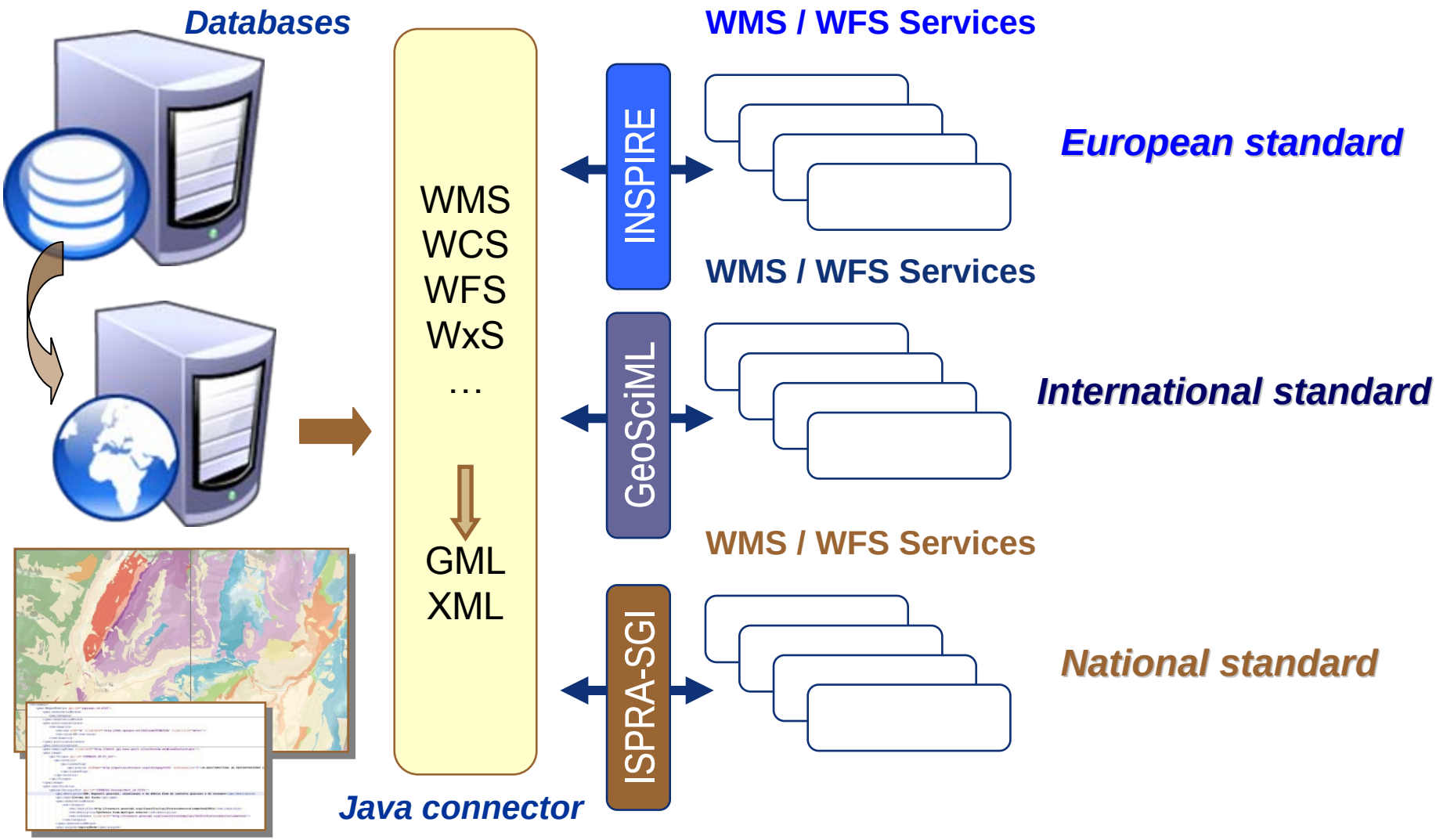
Mappatura – Fase 3 erogazione servizi

sgi3.isprambiente.it/eenvplus/geo100k/?SERVICE=WFS&VERSION=1.1.0&REQUEST=

```
- <gsmlgu:GeologicUnit gml:id="GU_014A031">
    <gml:identifier codeSpace="#EVENT_1">Geo100_GU014A031</g
    <gml:name>calcare di lusnizza</gml:name>
    <gsml:observationMethod nilReason="missing" xsi:nil="true"/>
    <gsml:purpose>typicalNorm</gsml:purpose>
  + <gsml:relatedFeature></gsml:relatedFeature>
  - <gsml:relatedFeature>
    - <gsmlga:GeologicHistory gml:id="GU_EV_014A031">
        <gsml:relationship xlink:href="http://resource.geosciml.org/cla
        <gsml:sourceRole nilReason="missing" xsi:nil="true"/>
        <gsml:targetRole nilReason="missing" xsi:nil="true"/>
      - <gsml:relatedFeature>
        - <gsmlga:GeologicEvent gml:id="EV_0.0">
            <gml:name>Orogenesi alpina</gml:name>
            <gsml:observationMethod nilReason="missing" xsi:nil="
            <gsml:purpose>instance</gsml:purpose>
            <gsml:relatedFeature nilReason="missing" xsi:nil="true"
            <gsml:classifier nilReason="missing" xsi:nil="true"/>
            <gsml:metadata gco:nilReason="missing" xsi:nil="true"/>
            <gsmlga:eventProcess xlink:href="http://resource.geoscim
            <gsmlga:numericAgeDate nilReason="missing" xsi:nil="
            <gsmlga:olderNamedAge xlink:href="http://resource.geos
            <gsmlga:youngerNamedAge xlink:href="http://resource.g
          - <gsmlga:eventEnvironment>
            - <swe:Category definition="http://inspire.ec.europa.eu/cc
              - <swe:extension>
                + <swe:Category definition="http://resource.geoscim
                </swe:extension>
              - <swe:identifier>
                  http://resource.geosciml.org/classifier/cgi/eventenvir
                </swe:identifier>
                <swe:label>marine_carbonate_platform_setting</swe:
                <swe:codeSpace xlink:href="http://resource.geosciml
              </swe:Category>
            </gsmlga:eventEnvironment>
            <gsmlga:prototype nilReason="missing" xsi:nil="true"/>
```

```
<gsml:samplingFrame xlink:href="http://inspire.ec.europa.eu/codelist/MappingFrameValue/surfaceGeology" xlink:title="Surface Geology"/>
+ <gsml:shape></gsml:shape>
- <gsml:specification>
  - <gsmlgu:GeologicUnit gml:id="GU_014A031">
      <gml:identifier codeSpace="#EVENT_1">Geo100_GU014A031</gml:identifier>
      <gml:name>calcare di lusnizza</gml:name>
      <gsml:observationMethod nilReason="missing" xsi:nil="true"/>
      <gsml:purpose>typicalNorm</gsml:purpose>
    - <gsml:relatedFeature>
      - <gsmlst:DefiningStructure gml:id="GU_STA2">
          <gsml:relationship/>
          <gsml:sourceRole/>
          <gsml:targetRole/>
        - <gsml:relatedFeature>
          - <gsmlst:Foliation gml:id="ST_3.0">
            + <gsml:observationMethod></gsml:observationMethod>
              <gsml:purpose>instance</gsml:purpose>
              <gsml:relatedFeature/>
              <gsml:classifier nilReason="missing"/>
              <gsml:metadata gco:nilReason="missing"/>
              <gsmlst:definingElement nilReason="missing"/>
              <gsmlst:foliationType xlink:href="http://resource.geosciml.org/classifier/cgi/foliationtype/bedding_lamination_structure"
              xlink:title="bedding_lamination_structure"/>
              <gsmlst:continuity nilReason="unknown"/>
              <gsmlst:intensity nilReason="unknown"/>
              <gsmlst:mineralElement/>
            - <gsmlst:orientation>
              - <CGI_PlanarOrientation>
                  <determinationMethod nilReason="missing"/>
                  <descriptiveOrientation nilReason="missing"/>
                  <convention nilReason="missing"/>
                  <azimuth nilReason="missing"/>
                  <dip nilReason="missing"/>
                  <polarity xlink:title="undefined"/>
                </CGI_PlanarOrientation>
```

Wrapper Connector



Wrapper Connector

```
- <entry>
  - <attribute>
      onegeology_ISPRA_Surface_Geology:DESCRIPTION__GEOLOGICUNIT_
    </attribute>
  - <gsml_uri>
      ge:MappedFeature/ge:specification/ge:GeologicUnit/ge:geologicHistory/ge:GeologicEvent/ge:name
    </gsml_uri>
  </entry>
- <entry>
    <attribute>onegeology_ISPRA_Surface_Geology:URN_AGE_L</attribute>
  - <gsml_uri>
      ge:MappedFeature/ge:specification/ge:GeologicUnit/ge:geologicHistory/ge:GeologicEvent/ge:olderNamedAge@xlink:href
    </gsml_uri>
  </entry>
- <entry>
    <attribute>onegeology_ISPRA_Surface_Geology:URN_AGE_U</attribute>
  - <gsml_uri>
      ge:MappedFeature/ge:specification/ge:GeologicUnit/ge:geologicHistory/ge:GeologicEvent/ge:youngerNamedAge@xlink:href
    </gsml_uri>
  </entry>
- <entry>
    <attribute>onegeology_ISPRA_Surface_Geology:GE_EVENT_PROCESS</attribute>
  - <gsml_uri>
      ge:MappedFeature/ge:specification/ge:GeologicUnit/ge:geologicHistory/ge:GeologicEvent/ge:eventProcess@xlink:href
    </gsml_uri>
  </entry>
```

Attributo INSPIRE

Configurazione propri dati

Application schema

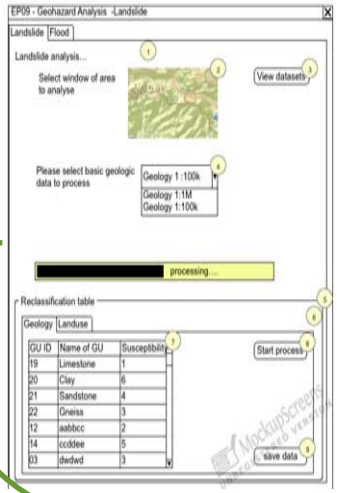
Geoserver Application schema

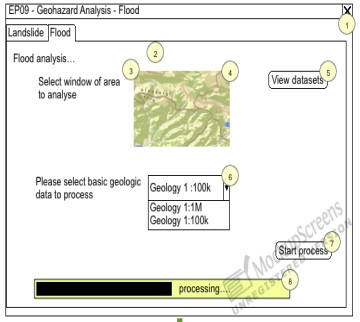
workspaces
- gco
- gmd
- gml
- gsml
  - gsml_MappedFeature
- gsmlem
- gsmlga
- gsmlgs
- gsmlgu
  - gsmlgu_GeologicUnit
- gsmlu
- swe
- xlink

gsml_MappedFeature
- AppSchemaDataAccess.xsd
- datastore.xml
- gsml_MappedFeature
  - featuretype.xml
- gsml_MappedFeature.xml

Application schema

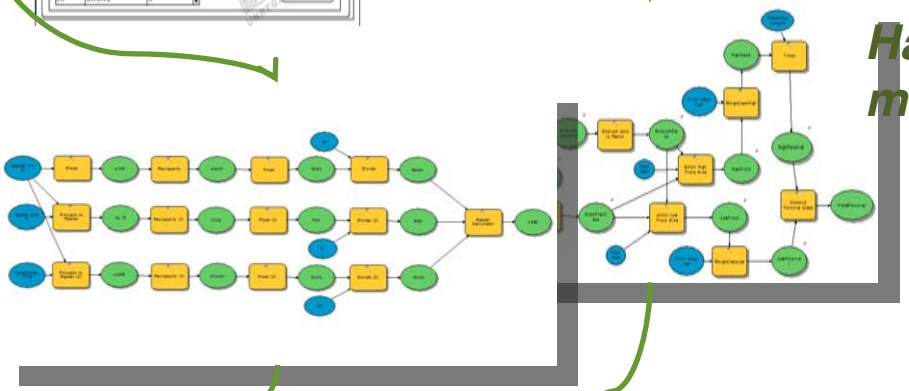
```
<typeMappings>
    <FeatureTypeMapping>
        <sourceDataStore>datastore</sourceDataStore>
      <sourceType>Geolitho100K_FVG_GSML</sourceType>
        <targetElement>gsml:MappedFeature</targetElement>
        <attributeMappings>
            <AttributeMapping>
                <targetAttribute>gsml:MappedFeature</targetAttribute>
                <idExpression><OCQL>getId()</OCQL></idExpression>
            </AttributeMapping>
            <AttributeMapping>
          <AttributeMapping>
          <AttributeMapping>
          <AttributeMapping>
          <AttributeMapping>
          <AttributeMapping>
            <targetAttribute>gsml:observationMethod/swe:Category/swe:extension/swe:Category/swe:value</targetAttribute>
            <sourceExpression><OCQL>'http://resource.geosciml.org/classifier/cgi/valuequalifier/always'</OCQL></sourceExpression>
          </AttributeMapping>
          <AttributeMapping>
            <targetAttribute>gsml:observationMethod/swe:Category/swe:label</targetAttribute>
            <sourceExpression><OCQL>'Compilation'</OCQL></sourceExpression>
          </AttributeMapping>
          <AttributeMapping>
          <AttributeMapping>
            <targetAttribute>gsml:observationMethod/swe:Category/swe:value</targetAttribute>
            <sourceExpression><OCQL>'http://resource.geosciml.org/classifier/cgi/mappedfeatureobservationmethod/compilation'</OCQL></so
          </AttributeMapping>
          <AttributeMapping>
          <AttributeMapping>
          <AttributeMapping>
                <targetAttribute>gsml:resolutionScale/gmd:MD_RepresentativeFraction/gmd:denominator/gco:Integer</targetAttribute>
                <sourceExpression><OCQL>'100000'</OCQL></sourceExpression>
            </AttributeMapping>
```



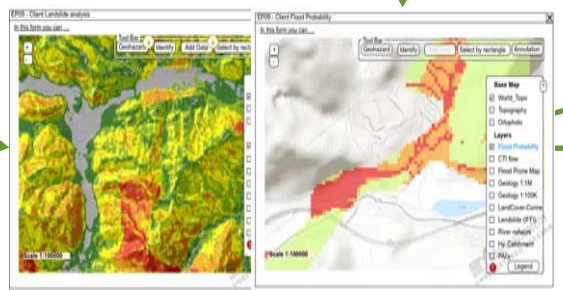


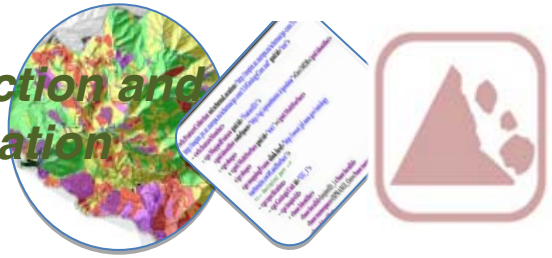
Geo-hazard widget

System access



Hazard modelling



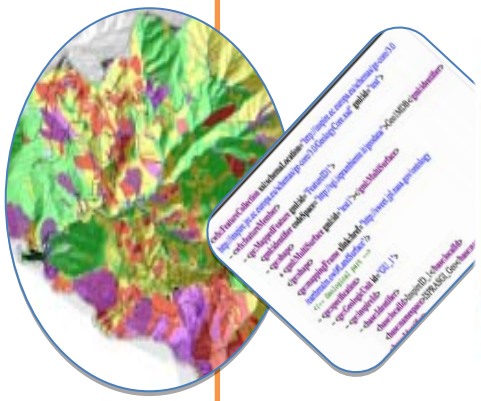


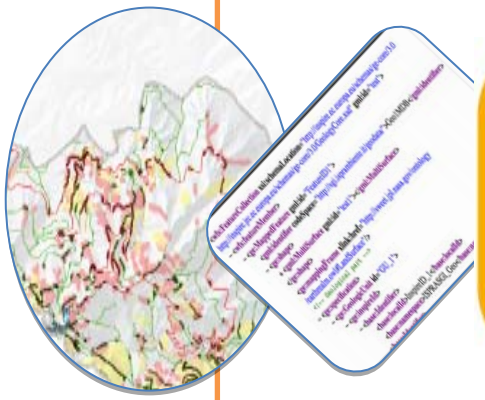
Geo-hazard production and INSPIRE harmonisation

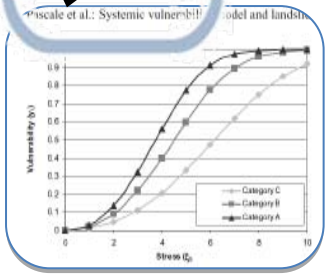
Data Harmonisation

Data Integration

Risk Level







Cosa c'è dietro una widget?

Gli scenari di geo-hazard delle frane e delle potenziali alluvioni sono basati su:

- ❑ Un invetario degli eventi franosi (con informazioni storiche e mappe che tengano conto delle riattivazioni);
- ❑ Armonizzazione semantica delle carte geologiche nelle aree di confine "amministrativo";
- ❑ Analisi morfometrica del DEM;

Quale è l'oboettivo del pilota:

- ❑ Dimostrare l'importanza di un layer geologico armonizzato per ottenere carte dei geohazard con copertura continua in Europa e sul proprio territorio nazionale

Flood procedure

Geologia 1:1M OneGeology-Europe secondo GE INSPIRE Data Model

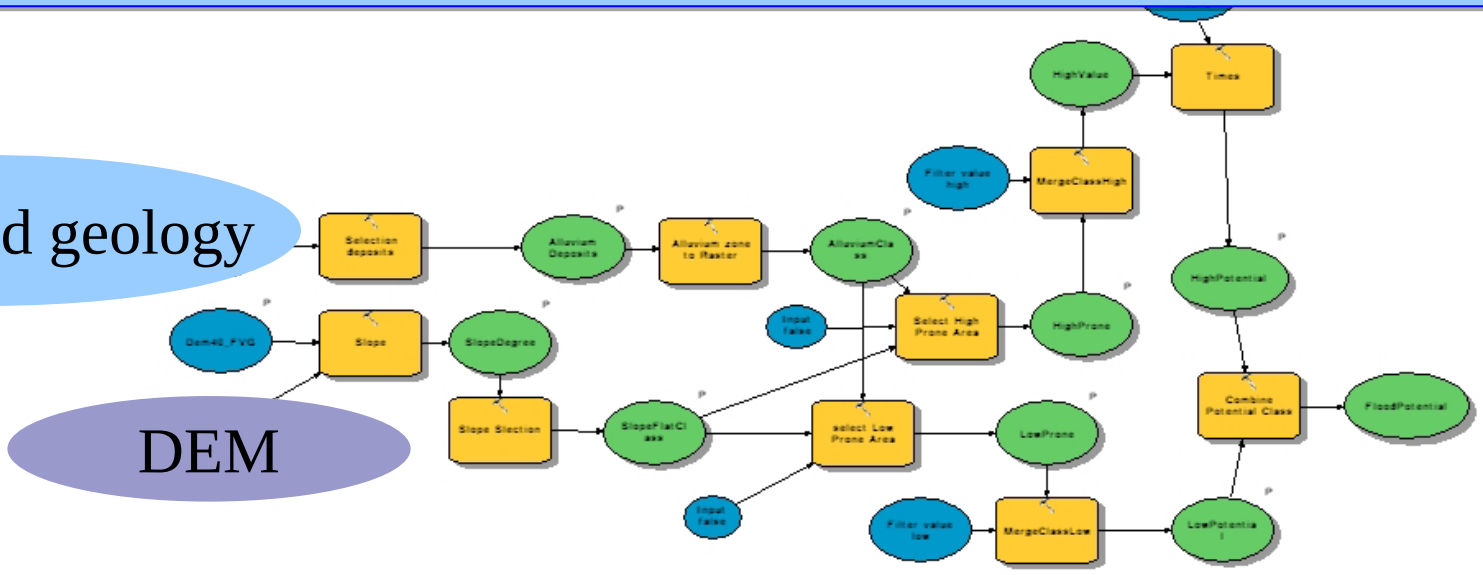
<ge:eventEnvironment
xlink:href="http://inspire.ec.europa.eu/codelist/EventEnvironmentValue/basin_plane_setting" xlink:title="**basin_plane_setting**"/>

Geologia 1:100k secondo GeoSciML 3.2 Data Model

<gsmlga:eventEnvironment>…
<swe:identifier>http://resource.geosciml.org/classifier/cgi/eventenvironment/**basin_plain_setting**</swe:identifier>….
</gsmlga:eventEnvironment>

Harmonised geology

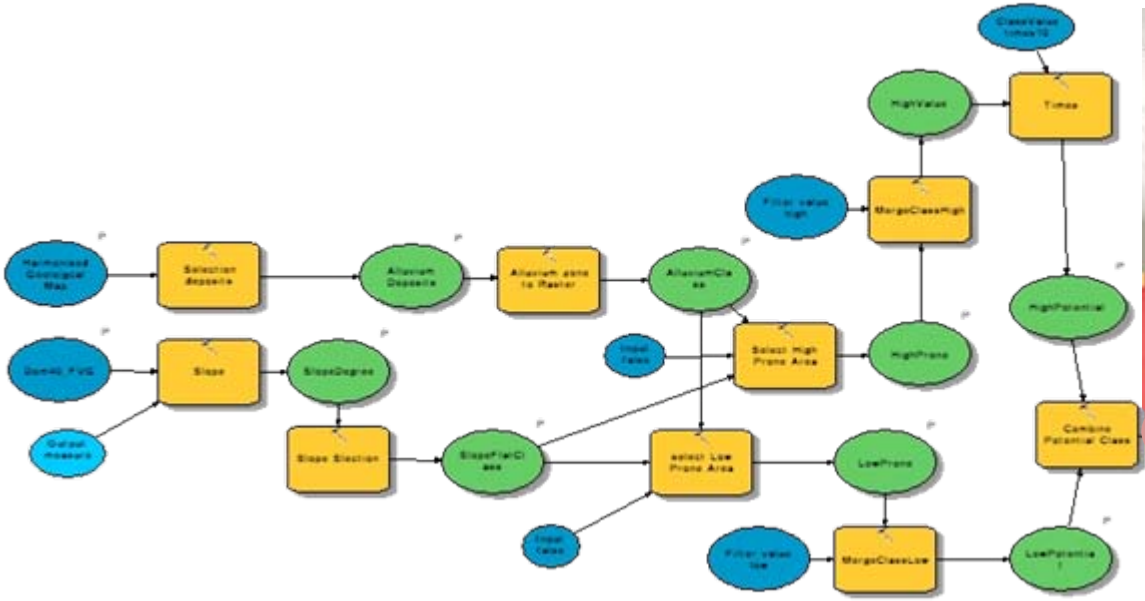
DEM

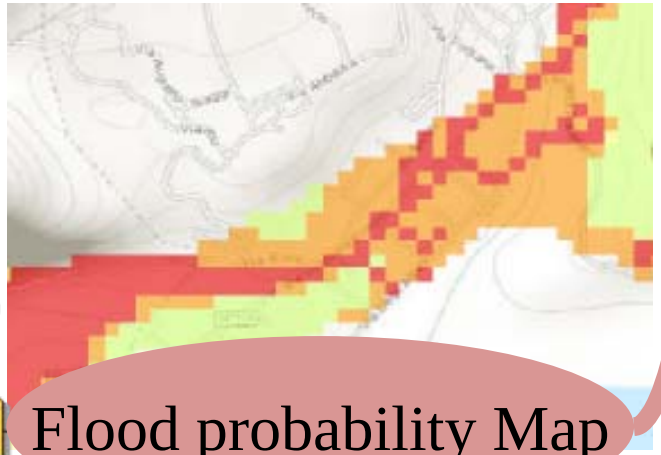


Flood procedure

Geohazard served in NRZ INSPIRE Data Model

<nz-core:typeOfHazard><nz-core:NaturalHazardClassification>
<nz-core:hazardCategory
xlink:href="http://inspire.ec.europa.eu/codelist/NaturalHazardCategoryValue/geologicalHydrological"/>
<nz-core:specificHazardType
xlink:href="http://inspire.ec.europa.eu/codelist/SpecificHazardTypeValue/flood"/>
</nz-core:NaturalHazardClassification></nz-core:typeOfHazard>……
<nz-core:LikelihoodOfOccurrence>
<nz-core:qualitativeLikelihood>High Probability</nz-core:qualitativeLikelihood>





Flood probability Map

Landslide procedure

Geologia 1:1M OneGeology-Europe secondo GE INSPIRE Data Model

<ge:CompositionPart><ge:material xlink:title="**clastic_sediment**"
xlink:href="http://inspire.ec.europa.eu/codelist/LithologyValue/clasticSediment/"/>
…

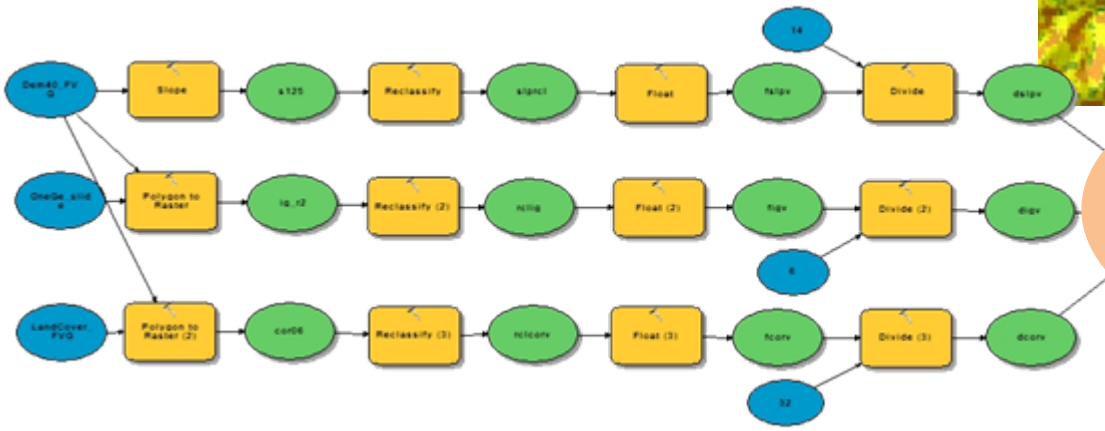
Geologia 1:100k secondo GeoSciML 3.2 Data Model

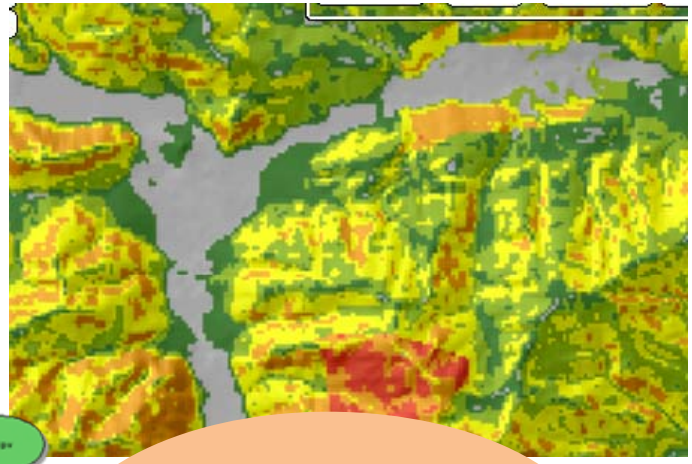
<gsmlgu:composition><gsmlgu:CompositionPart>…<gsmlgu:material><gsmlem:RockMaterial gml:id="id_n">…<gsmlem:consolidationDegree
xlink:href="http://resource.geosciml.org/classifier/cgi/consolidationdegree/unconsolidated" xlink:title="unconsolidated"/>
<gsmlem:lithology
xlink:href="http://resource.geosciml.org/classifier/cgi/lithology/clastic_sediment"
xlink:title="**clastic_sediment**"/>…
</gsmlgu:composition>…..
<gsmlst:Foliation
xlink:href="http://resource.geosciml.org/classifier/cgi/foliationtype/tectonic_foliation" />

Harmonised geology

Landslide procedure

Geohazard served in NRZ INSPIRE Data Model



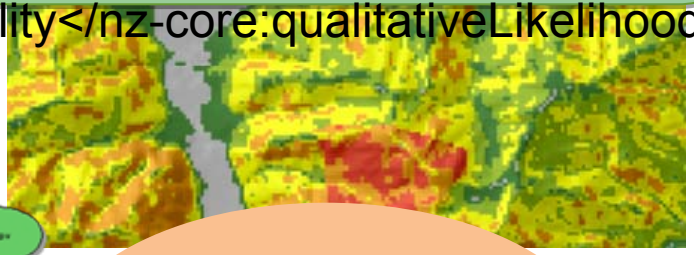


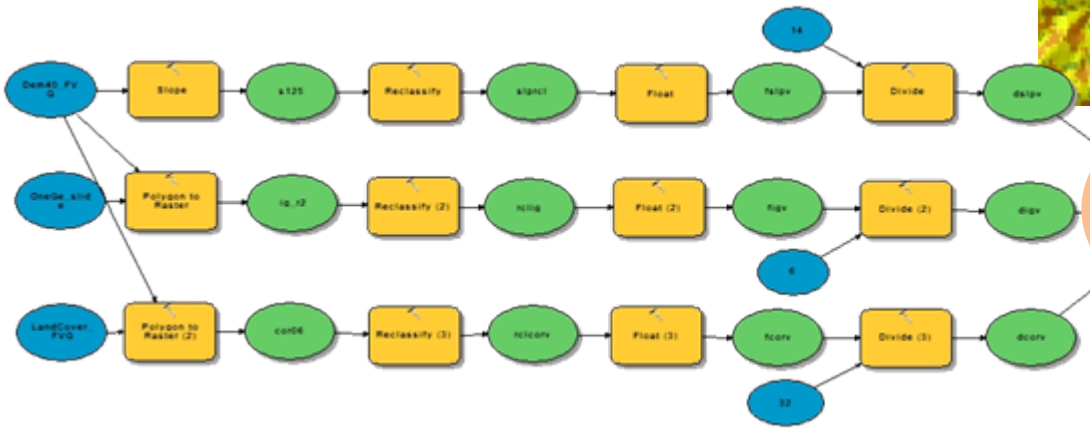
Landslide susceptibility Map

Landslide procedure

Geohazard served in NRZ INSPIRE Data Model

<nz-core:typeOfHazard><nz-core:NaturalHazardClassification>
<nz-core:hazardCategory
xlink:href="http://inspire.ec.europa.eu/codelist/NaturalHazardCategoryValue/landslide"/>
<nz-core:specificHazardType
xlink:href="http://inspire.ec.europa.eu/codelist/SpecificHazardTypeValue/landslideSusceptibility"/>
</nz-core:NaturalHazardClassification></nz-core:typeOfHazard>……
<nz-core:LikelihoodOfOccurrence>
<nz-core:qualitativeLikelihood>High Susceptibility</nz-core:qualitativeLikelihood>



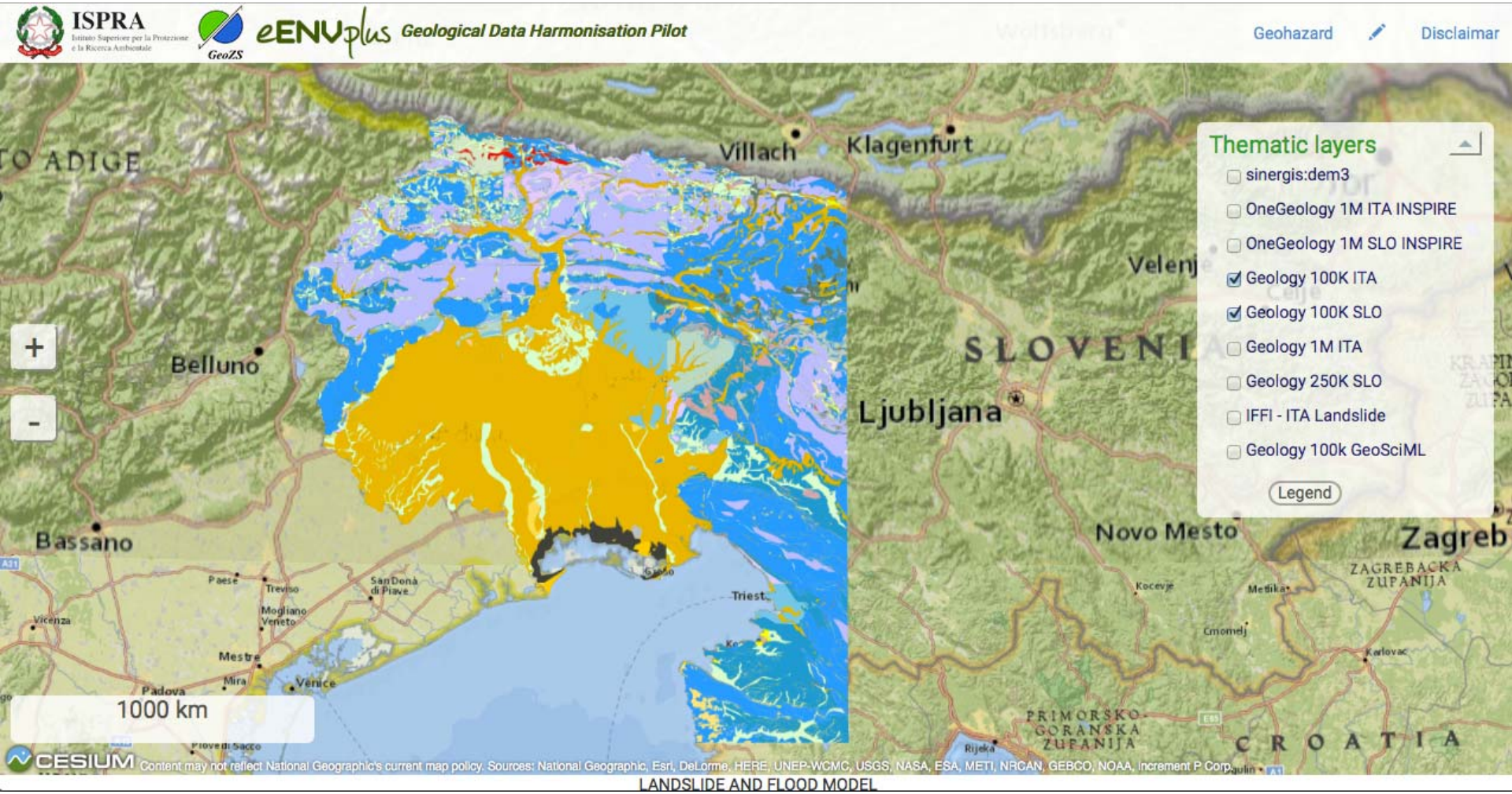


Landslide susceptibility Map

Harmonisation NRZ input

```
<gml:featureMember>
 – <nz-core:HazardArea gml:id="HazardAreaNr.424">
    <gml:description>ID_sorgente:0;MAPID:0:Note:</gml:description>
    <nz-core:beginLifeSpanVersion>2014-03-25T00:00:00+01:00</nz-core:beginLifeSpanVersion>
    <nz-core:determinationMethod>indirectDetermination</nz-core:determinationMethod>
  – <nz-core:inspireId>
    – <base:Identifier>
        <base:localId>101607_Ambito19 - Cinque Terre</base:localId>
        <base:namespace>IT_PAI_RegioneLiguria</base:namespace>
        <base:versionId>1.0</base:versionId>
      </base:Identifier>
    </nz-core:inspireId>
  – <nz-core:typeOfHazard>
    – <nz-core:NaturalHazardClassification>
        <nz-core:hazardCategory xlink:href="http://inspire.ec.europa.eu/codelist/NaturalHazardCategoryValue/landslide"/>
        <nz-core:specificHazardType xlink:href="http://inspire.ec.europa.eu/codelist/SpecificHazardTypeValue/landslideSusceptibility"/>
      </nz-core:NaturalHazardClassification>
    </nz-core:typeOfHazard>
    <nz-core:source xlink:href="#id_0110024500"/>
  – <nz-core:geometry>
    – <gml:Polygon gml:id="_525a36b2-7f65-4627-9bff-b8a41c1539de" srsName="EPSG:3044">
      – <gml:exterior>
        – <gml:LinearRing>
          + <gml:posList></gml:posList>
          </gml:LinearRing>
        </gml:exterior>
      </gml:Polygon>
    </nz-core:geometry>
  – <nz-core:likelihoodOfOccurrence>
    – <nz-core:LikelihoodOfOccurrence>
        <nz-core:qualitativeLikelihood>Pg4</nz-core:qualitativeLikelihood>
        <nz-core:quantitativeLikelihood xsi:nil="true"/>
      – <nz-core:assessmentMethod xlink:href="http://www.cartografiarl.regione.liguria.it/PianiDiBacino/PdBSpezia/PDB_Ambito19.asp?dove=Pg4">
        – <base2:DocumentCitation gml:id="doc_occ423">
          – <gml:description>
              shpfile:IFFI_PAI_join:Fornitore:Provincia di La Spezia:PDB:Ambito19 - Cinque Terre
```

Widget - Client



LANDSLIDE AND FLOOD MODEL

Grazie per l'attenzione!

? Domande?

Riferimento ai progetti

Web: http://www.eenvplus.eu
http://www.life-imagine.eu