

# EC 231 – S'entraîner à la leçon 1

## TP – Utiliser des cartes géologiques à l'oral du CAPES



Denis Sorel, Pierre Vergély

### Atlas d'initiation aux cartes et coupes géologiques

4<sup>e</sup> ÉDITION



brgméditions

DUNOD



Dominique Frizon de Lamotte, Pascale Leturmy  
Pauline Souloumiac, Adrien Frizon de Lamotte

### Objets et structures géologiques en trois dimensions

Observation, interprétation et construction de modèles en 3D

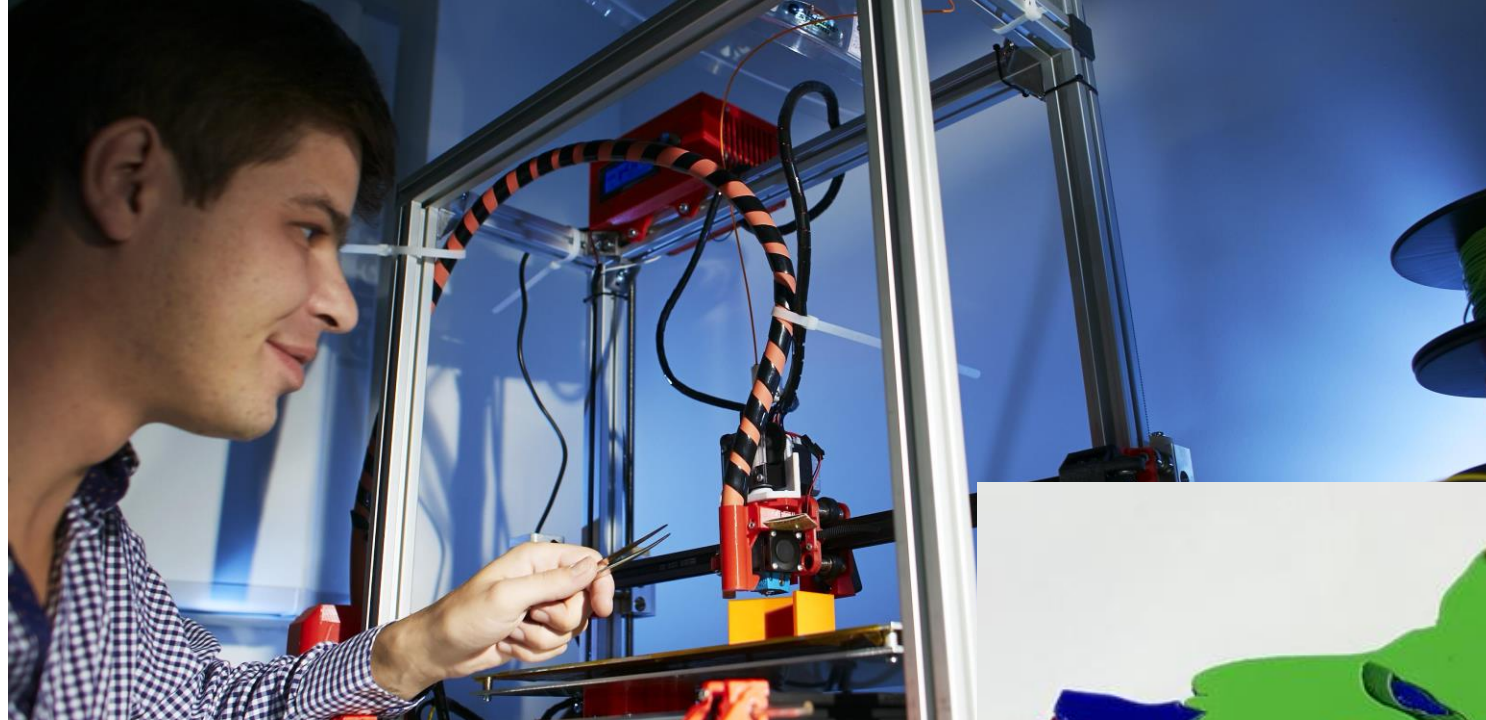


DUNOD

Master 1 MEEF - Année 2021-2022

O. Avisseau & L. Morzelle

# Projet U-maker : des modèles imprimés en 3D et des vidéos pour aider à la lecture des cartes géologiques



Adrien Frizon-de-Lamotte



# Avant la séance :

Visionnage des vidéos en classe inversée (*et prise de notes...*):

- **Condé-sur-Noireau** (pour tous)

<https://vimeo.com/489868138/5e9fd51e76>

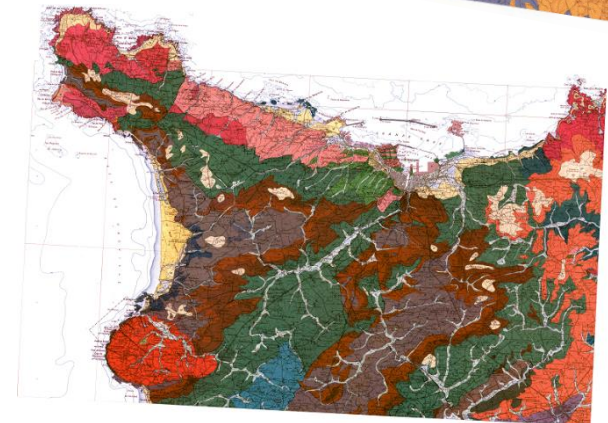
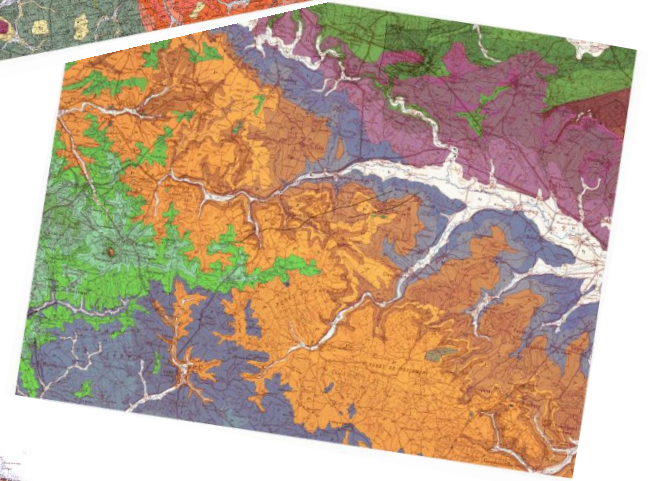
Au choix :

- **Renwez** env. 15min

<https://vimeo.com/489854709/dc6189ebd2>

- **Cherbourg** env. 20min

<https://vimeo.com/489864469/16511a090a>



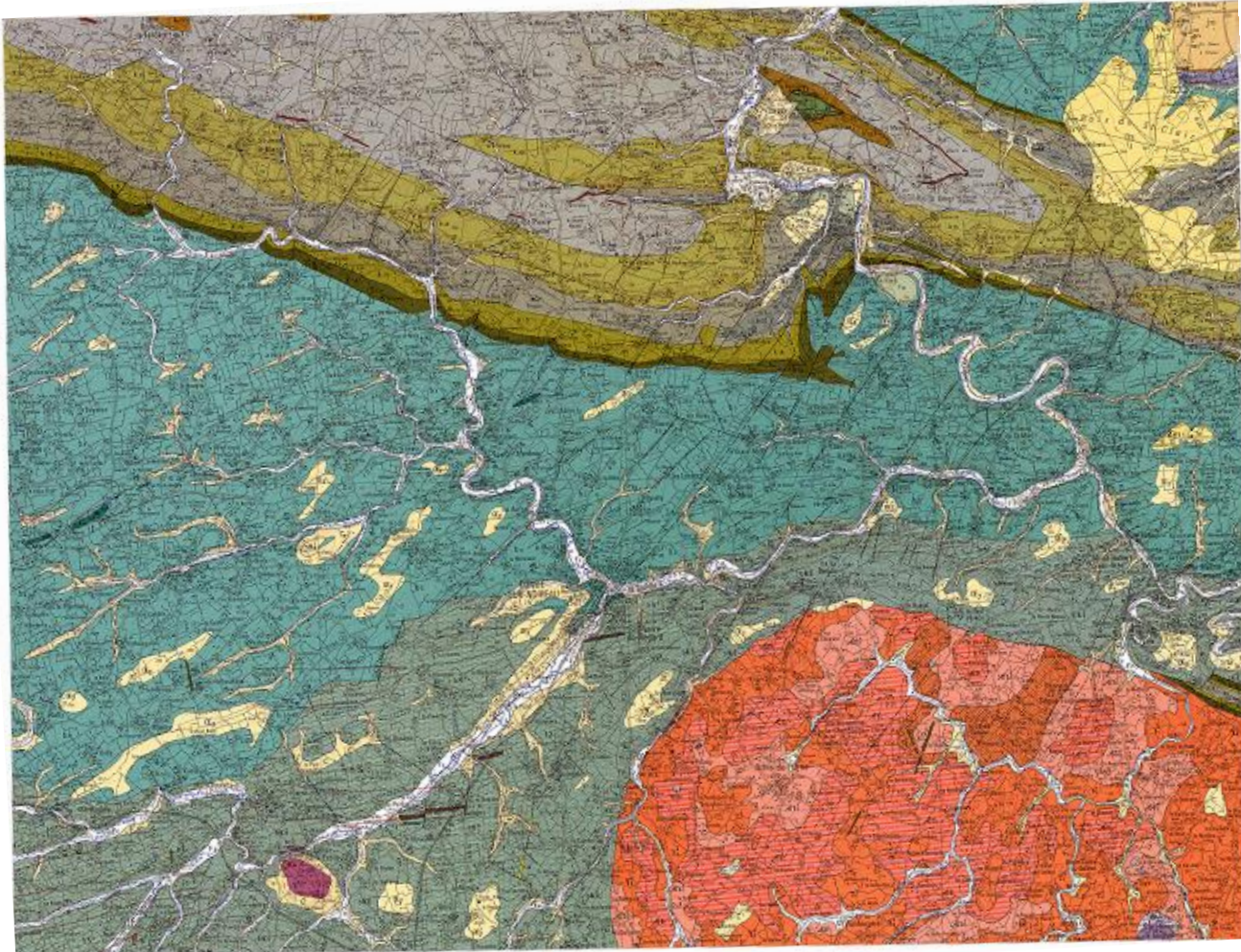
# En salle - 1<sup>ème</sup> partie (env. 1h15)

Répartition en trois groupes de travail :

- G1 : Condé-sur-Noireau
- G2 : Cherbourg
- G3 : Renwez

**Consigne : Réaliser la présentation orale d'une activité élève autour de l'exploitation d'une des cartes (support de présentation – max 3 diapos).**

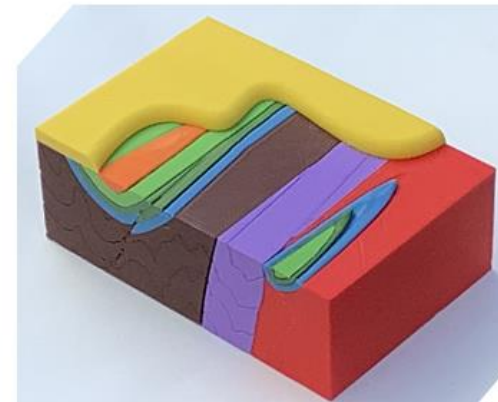
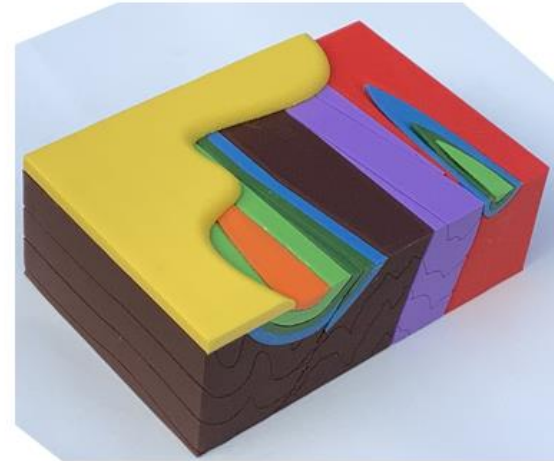
# La carte de Condé-sur-Noireau au 1/50.000ème



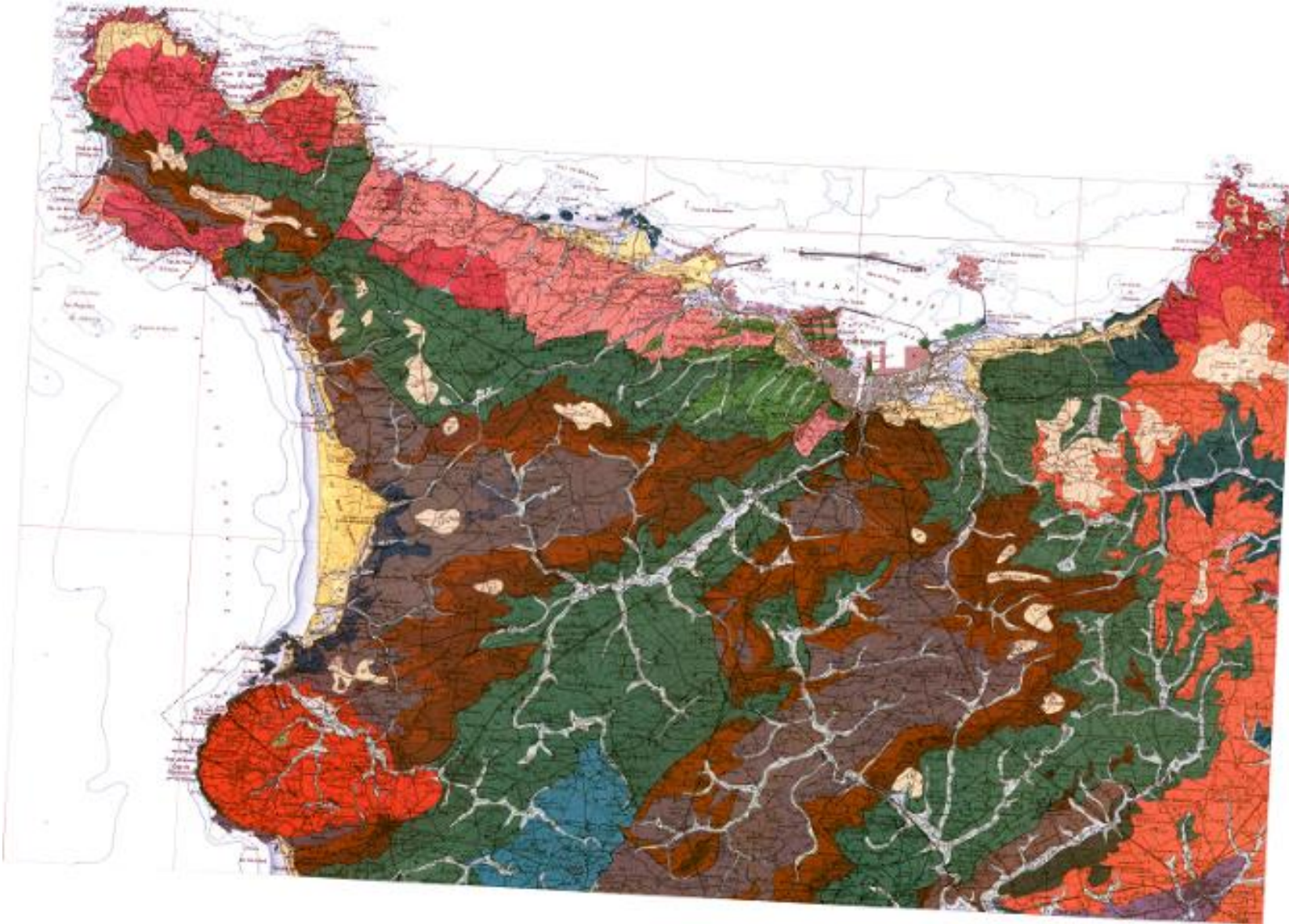
Thèmes majeurs :

- Datation relative (auréole de métamorphisme autour d'une intrusion granitique)
- Le plissement (synclinal)
- La discordance angulaire

Un bloc-diagramme générique imprimé en 3D permet de synthétiser les faits majeurs observés sur la carte Condé-sur-Noireau



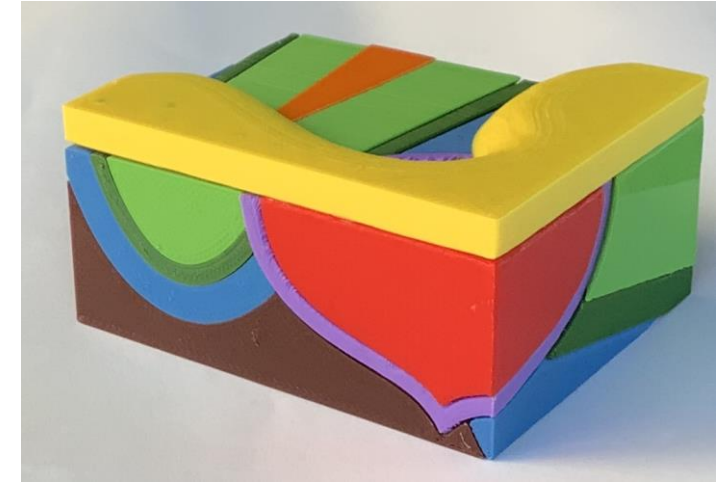
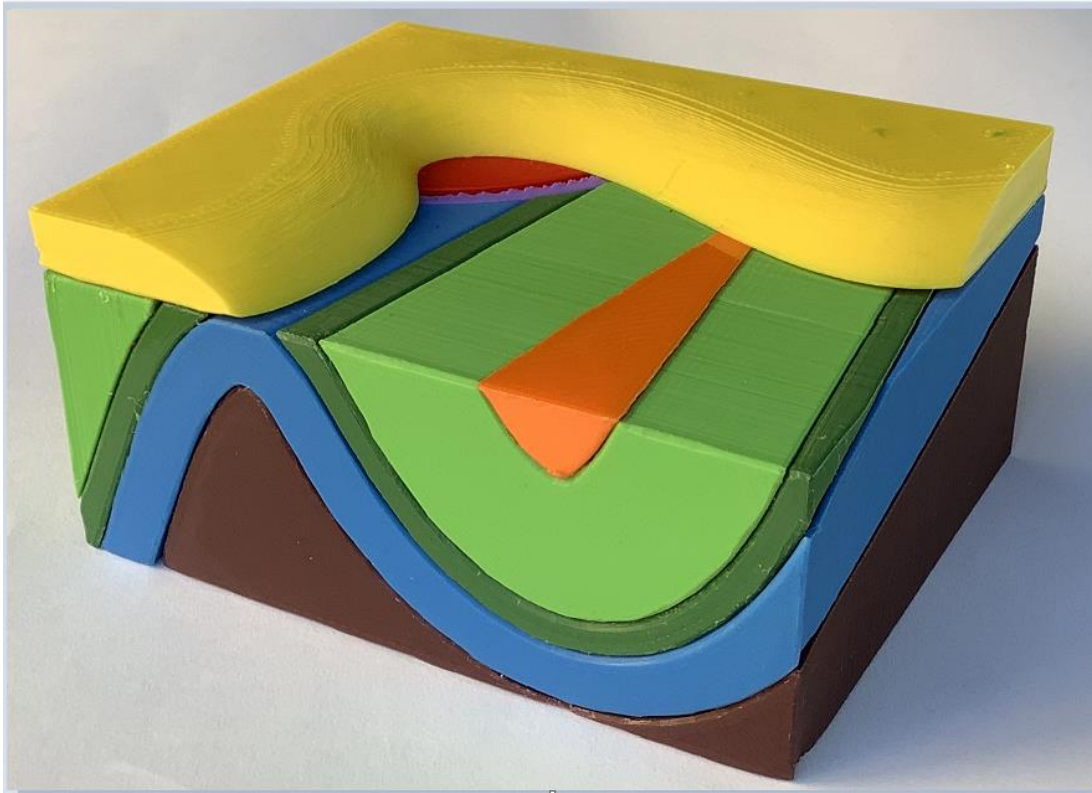
# La carte de Cherbourg au 1/50.000ème



Thèmes majeurs :

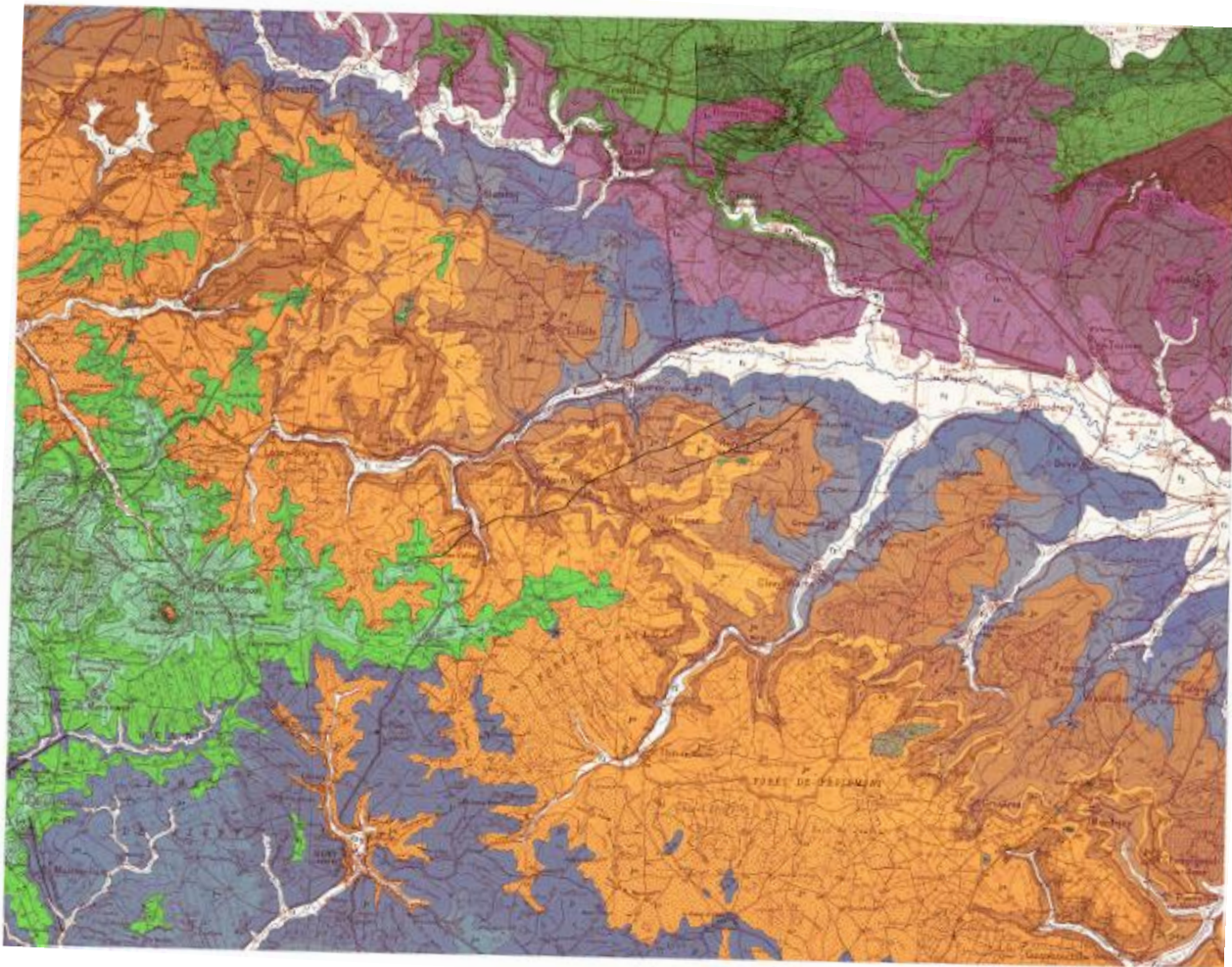
- Construction d'un schéma structural
- Datation relative de la mise en place d'un granite
- Forme d'un pluton granitique

Un bloc-diagramme générique imprimé en 3D permet de synthétiser les faits majeurs observés sur la carte Cherbourg





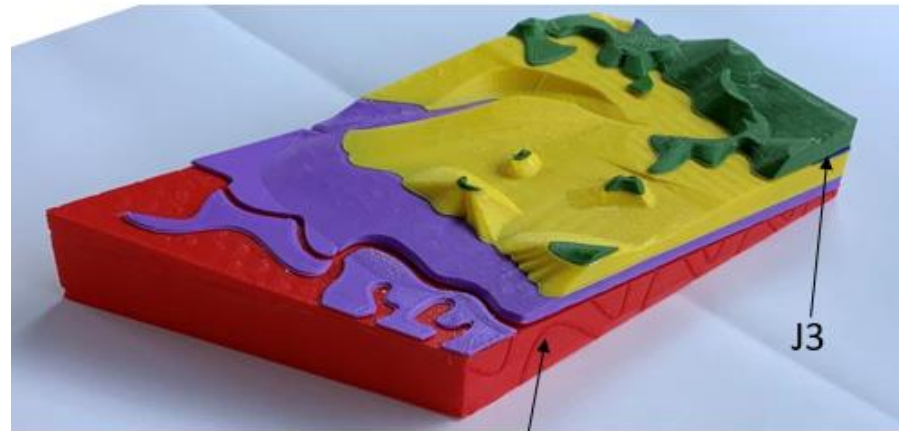
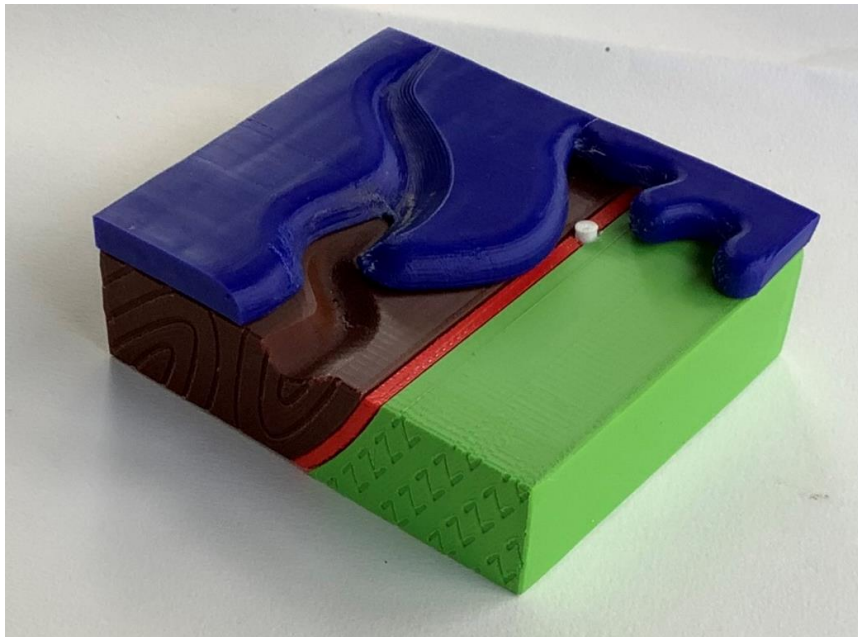
# La carte de Cherbourg au 1/50.000ème



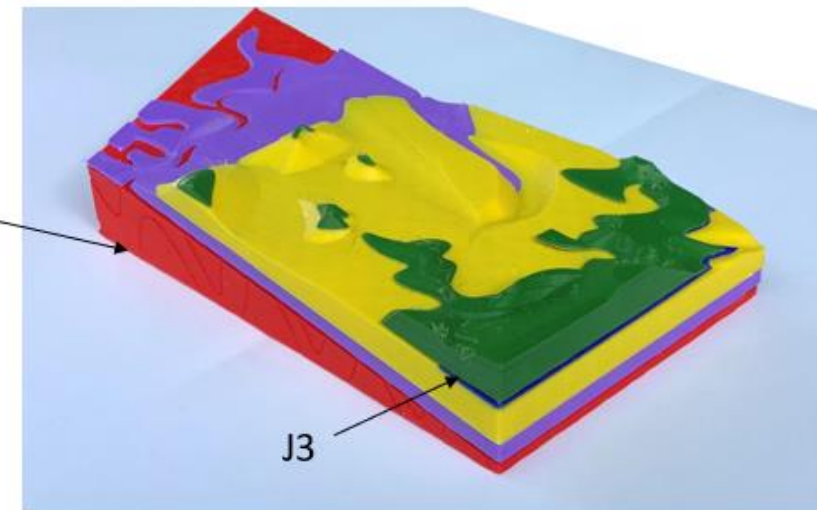
Thèmes majeurs :

- La notion de discordance et de cycle sédimentaire
- La notion de socle et de couverture
- Biseaux de la grande transgression du Crétacé supérieur

Des blocs-diagrammes génériques imprimé en 3D permettent de synthétiser les faits majeurs observés sur la carte Renwez



Socle Varisque



J3

# En salle - 2<sup>ème</sup> partie (env. 1h)

Constitution de trois groupes travaillant chacun sur une carte locale ou de la liste du CAPES :

- G1 : Pontoise
- G2 : Grenoble
- G3 : Bédarieux

**Consigne : Réaliser un support de présentation (max 3 diapos) de l'intérêt pédagogique d'une des cartes.**

- Identifier des zones/structures géologiques remarquables en lien avec des thèmes des programmes.



# INTERNATIONAL STRATIGRAPHIC CHART

International Commission on Stratigraphy



Eonothem Eon	Erathem Era	System Period	Series Epoch	Stage Age	Age Ma	GSSP
Phanerozoic	Cenozoic	Quaternary	Holocene		0.0117	▶
			Upper		0.126	
				"Ionian"	0.781	
			Pleistocene	Calabrian	1.806	▶
				Gelasian	2.588	▶
				Pliocene	3.600	▶
		Neogene	Miocene	Zanclean	5.332	▶
				Messinian	7.248	▶
				Tortonian	11.608	▶
				Serravallian	13.82	▶
				Langhian	15.97	▶
			Pliocene	Burdigalian	20.43	▶
	Aquitanian			23.03	▶	
	Oligocene			28.4 ± 0.1	▶	
	Rupelian			33.9 ± 0.1	▶	
	Eocene			37.2 ± 0.1	▶	
	Paleogene	Eocene	Lutetian	40.4 ± 0.2	▶	
			Ypresian	48.6 ± 0.2	▶	
			Thanetian	55.8 ± 0.2	▶	
			Paleocene	58.7 ± 0.2	▶	
			Danian	-61.1	▶	
		Oligocene	Selandian	65.5 ± 0.3	▶	
			Maestrichtian	70.6 ± 0.6	▶	
			Campanian	83.5 ± 0.7	▶	
			Santonian	85.8 ± 0.7	▶	
			Coniacian	-88.6	▶	
	Mesozoic	Cretaceous	Turonian	93.6 ± 0.8	▶	
			Cenomanian	99.6 ± 0.9	▶	
			Albian	112.0 ± 1.0	▶	
			Aptian	125.0 ± 1.0	▶	
			Barremian	130.0 ± 1.5	▶	
		Lower	Hauterivian	-133.9	▶	
Valanginian			140.2 ± 3.0	▶		
Berriasian			145.5 ± 4.0	▶		

Eonothem Eon	Erathem Era	System Period	Series Epoch	Stage Age	Age Ma	GSSP
Phanerozoic	Mesozoic	Jurassic	Upper	Tithonian	145.5 ± 4.0	▶
				Kimmeridgian	150.8 ± 4.0	▶
				Oxfordian	-155.6	▶
			Middle	Callovian	161.2 ± 4.0	▶
				Bathonian	164.7 ± 4.0	▶
				Bajocian	167.7 ± 3.5	▶
		Lower	Aalenian	171.6 ± 3.0	▶	
			Toarcian	175.6 ± 2.0	▶	
			Pliensbachian	183.0 ± 1.5	▶	
			Sinemurian	189.6 ± 1.5	▶	
			Hettangian	196.5 ± 1.0	▶	
			Rhaetian	199.6 ± 0.6	▶	
	Triassic	Upper	Norian	203.6 ± 1.5	▶	
			Carmanian	216.5 ± 2.0	▶	
			Ladinian	-228.7	▶	
		Middle	Anisian	237.0 ± 2.0	▶	
			Olenekian	-245.9	▶	
			Induan	-249.5	▶	
	Paleozoic	Permian	Lopingian	251.0 ± 0.4	▶	
			Wuchapingian	253.8 ± 0.7	▶	
			Capitanian	260.4 ± 0.7	▶	
			Wordian	265.8 ± 0.7	▶	
			Roadian	268.0 ± 0.7	▶	
		Carboniferous	Guadalupian	Kungurian	270.6 ± 0.7	▶
				Artinskian	275.6 ± 0.7	▶
				Sakmarian	284.4 ± 0.7	▶
			Asselian	Serpukhovian	294.6 ± 0.8	▶
				Gzhelian	299.0 ± 0.8	▶
	Carboniferous	Pennsylvanian	Upper	Kasimovian	303.4 ± 0.9	▶
			Middle	Moscovian	307.2 ± 1.0	▶
			Lower	Bashkirian	311.7 ± 1.1	▶
			Upper	Serpukhovian	318.1 ± 1.3	▶
Mississippian		Middle	Visean	328.3 ± 1.6	▶	
		Lower	Tournaisian	345.3 ± 2.1	▶	
				352.2 ± 2.5	▶	

Eonothem Eon	Erathem Era	System Period	Series Epoch	Stage Age	Age Ma	GSSP
Phanerozoic	Paleozoic	Devonian	Upper	Famennian	358.2 ± 2.5	▶
				Frasnian	374.5 ± 2.6	▶
				Frasnian	385.3 ± 2.6	▶
			Middle	Givetian	391.8 ± 2.7	▶
				Eifelian	397.5 ± 2.7	▶
				Emsian	407.0 ± 2.8	▶
		Lower	Pragian	411.2 ± 2.8	▶	
			Lochkovian	418.0 ± 2.8	▶	
			Pridoli	418.7 ± 2.7	▶	
		Silurian	Ludlow	Ludfordian	421.3 ± 2.6	▶
				Gorstian	422.9 ± 2.5	▶
				Homerian	426.2 ± 2.4	▶
	Wenlock		Sheinwoodian	428.2 ± 2.3	▶	
			Telychian	436.0 ± 1.9	▶	
			Aeronian	439.0 ± 1.8	▶	
	Ordovician	Upper	Rhuddanian	443.7 ± 1.5	▶	
			Hirnantian	445.6 ± 1.5	▶	
			Katian	455.8 ± 1.6	▶	
		Middle	Sandbian	460.9 ± 1.6	▶	
			Darriwilian	468.1 ± 1.6	▶	
			Dapingian	471.8 ± 1.6	▶	
	Lower	Floian	478.6 ± 1.7	▶		
		Tremadocian	483.3 ± 1.7	▶		
		Stage 10	-492 *	▶		
	Cambrian	Furongian	Stage 9	-496 *	▶	
			Paibian	-499	▶	
			Guzhangian	-503	▶	
		Series 3	Drumian	-506.5	▶	
			Stage 5	-510 *	▶	
			Stage 4	-515 *	▶	
	Series 2	Stage 3	-521 *	▶		
		Stage 2	-528 *	▶		
Fortunian		542.0 ± 1.0	▶			

This chart was drafted by Gabi Ogg. Intra Cambrian unit ages with \* are informal, and awaiting ratified definitions.

Copyright © 2009 International Commission on Stratigraphy

Eonothem Eon	Erathem Era	System Period	Age Ma	GSSP GSSA	
Precambrian	Proterozoic	Neoproterozoic	Ediacaran	542	▶
			Cryogenian	-635	▶
			Tonian	850	▶
		Meso-proterozoic	Stenian	1000	▶
			Ectasian	1200	▶
			Calymmian	1400	▶
	Archean	Paleoproterozoic	Statherian	1600	▶
			Orosirian	1800	▶
			Rhyacian	2050	▶
		Neoproterozoic	Siderian	2300	▶
			Neoproterozoic	2500	▶
			Neoproterozoic	2800	▶
Hadean (informal)	Neoproterozoic	Neoproterozoic	3200	▶	
		Neoproterozoic	3600	▶	
		Neoproterozoic	4000	▶	
	Hadean (informal)		-4600	▶	

Subdivisions of the global geologic record are formally defined by their lower boundary. Each unit of the Phanerozoic (~542 Ma to Present) and the base of Ediacaran are defined by a basal Global Boundary Stratotype Section and Point (GSSP), whereas Precambrian units are formally subdivided by absolute age (Global Standard Stratigraphic Age, GSSA). Details of each GSSP are posted on the ICS website ([www.stratigraphy.org](http://www.stratigraphy.org)).

Numerical ages of the unit boundaries in the Phanerozoic are subject to revision. Some stages within the Cambrian will be formally named upon international agreement on their GSSP limits. Most sub-Series boundaries (e.g., Middle and Upper Aptian) are not formally defined.

Colors are according to the Commission for the Geological Map of the World ([www.gmw.org](http://www.gmw.org)).

The listed numerical ages are from "A Geologic Time Scale 2004", by F.M. Gradstein, J.G. Ogg, A.G. Smith, et al. (2004; Cambridge University Press) and "The Concise Geologic Time Scale" by J.G. Ogg, G. Ogg and F.M. Gradstein (2006).