

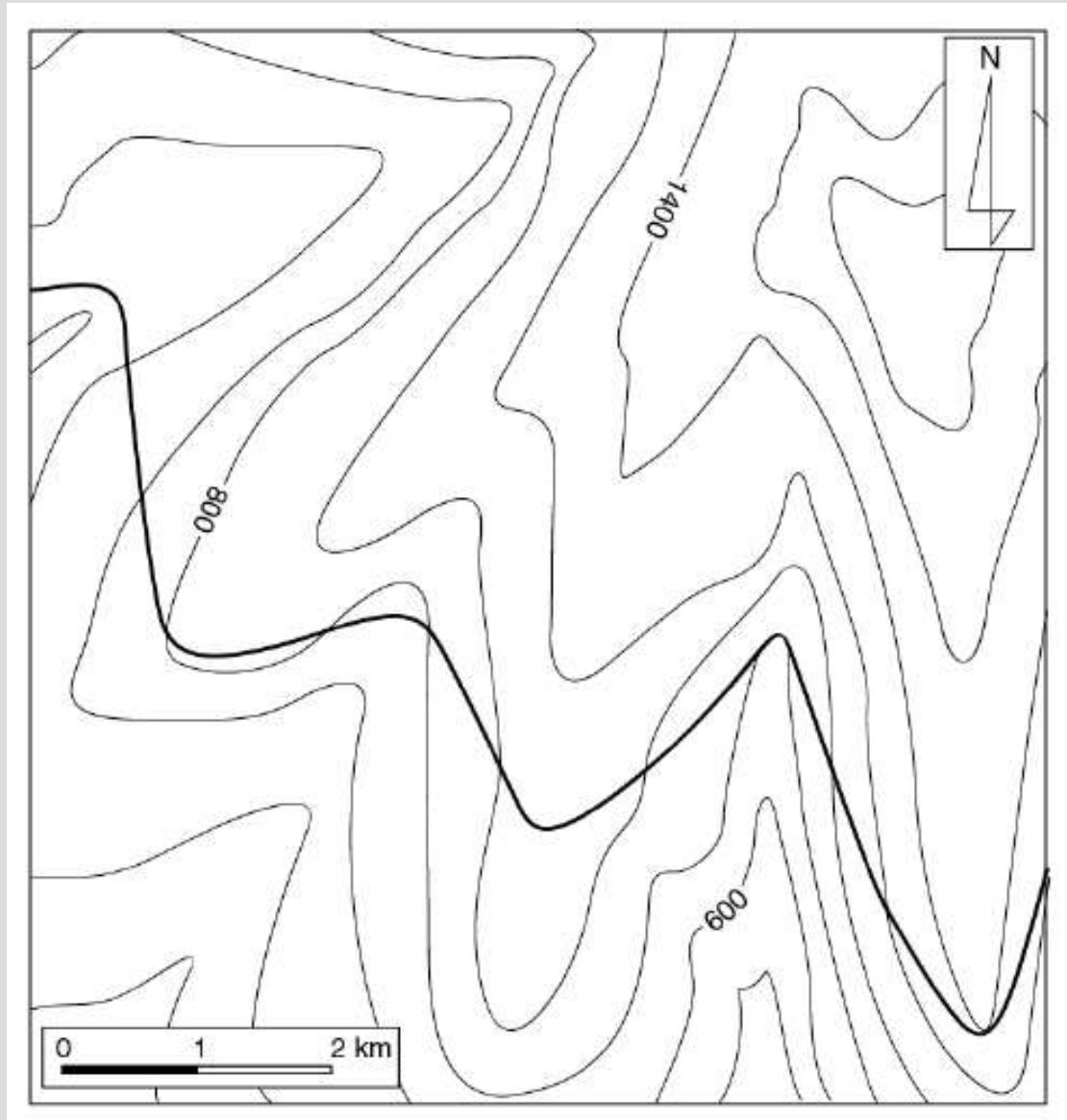
Exercice 1.

Sur la carte topographique ci-contre :

→ repérer les talwegs en bleu et les lignes de crête en noir,

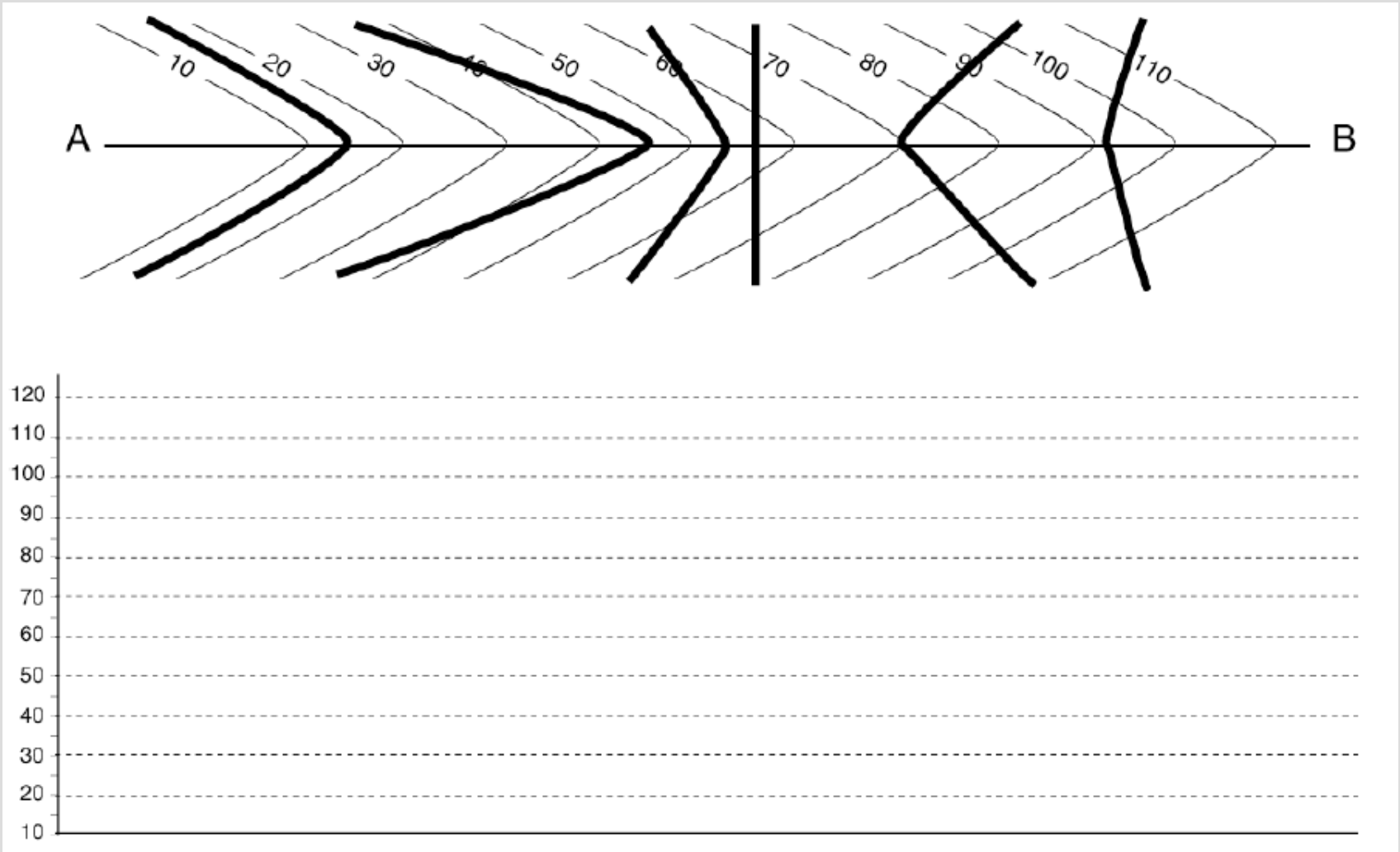
→ donner l'équidistance des courbes de niveau,

→ déterminer la direction et le pendage du plan indiqué en gras.



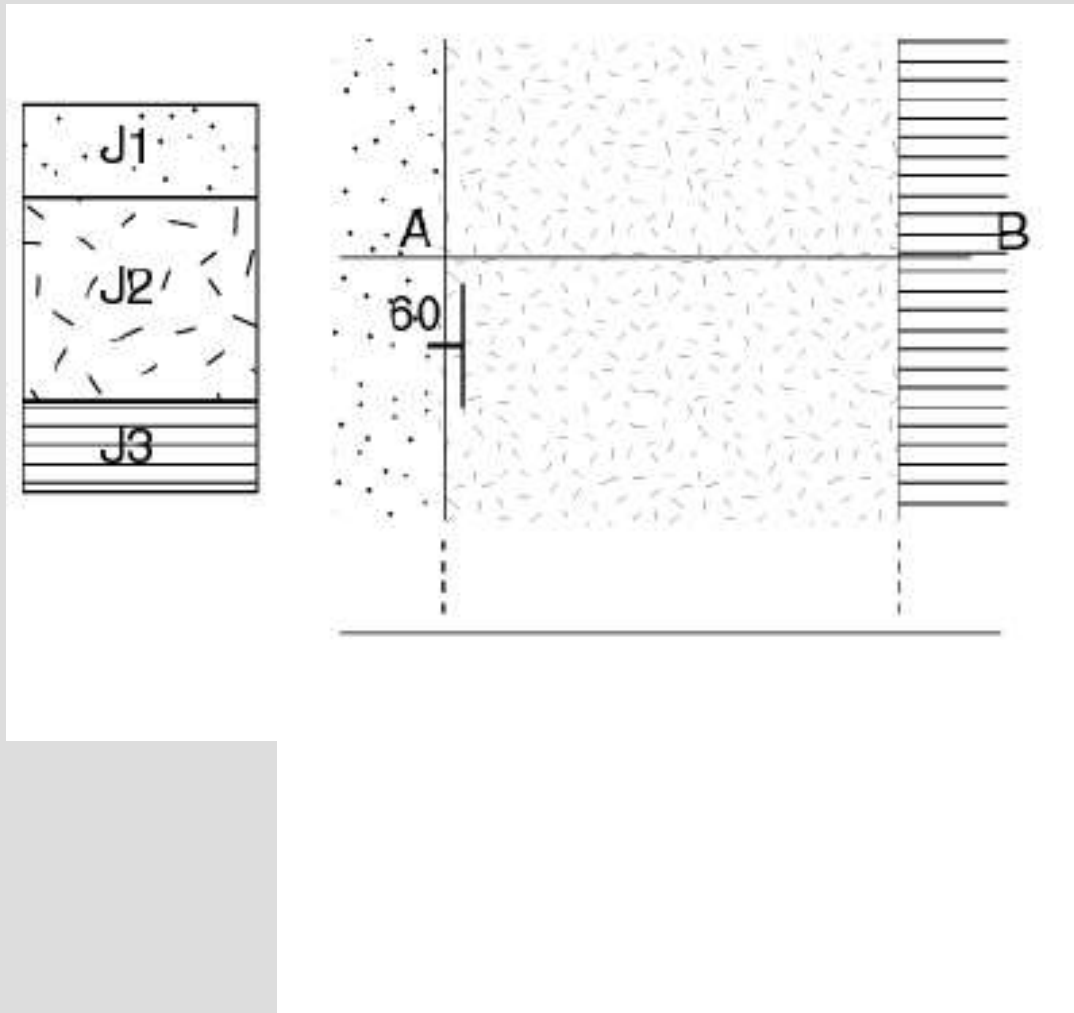
Exercice 2.

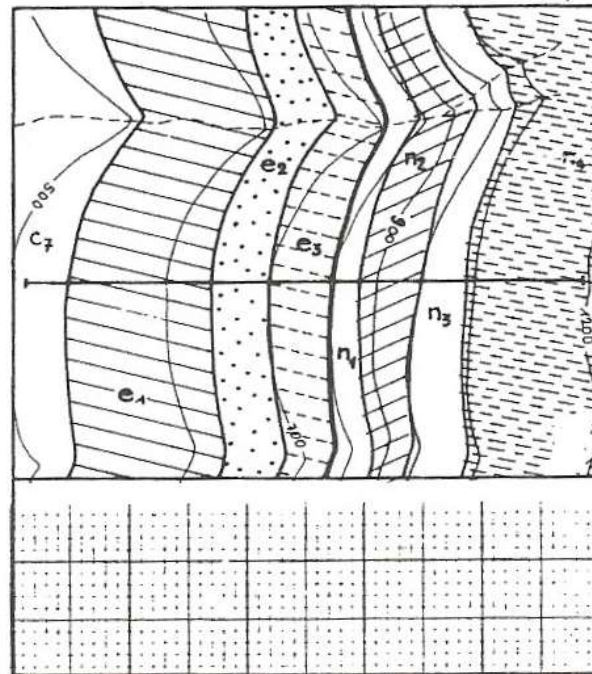
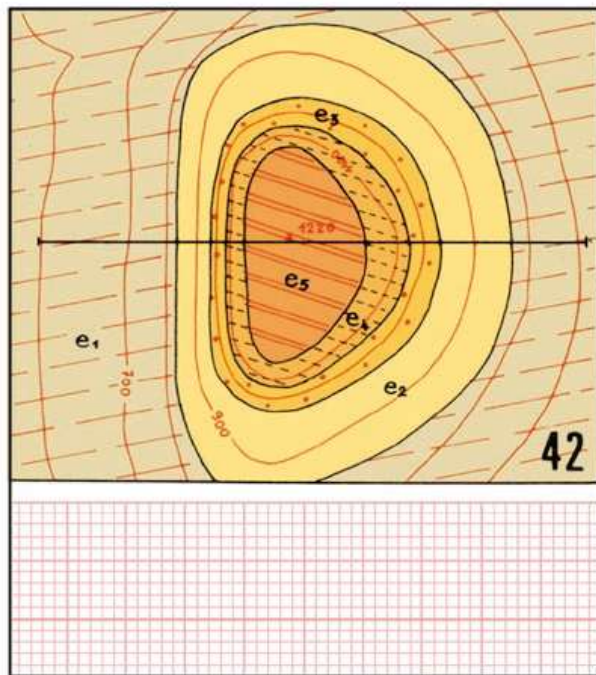
→ Représenter en coupe les plans correspondant au pendage de chaque couche dont le contour figure ci-dessous :



Exercice 3.

→ Construire les coupes correspondant aux extraits de carte ci-dessous.





Epaisseur des couches :

n_4 : 300 m

n_3 : 150 m

n_2 : 200 à 250 m

n_1 : 100 m

e_3 : 150 à 180 m

e_2 : 100 m

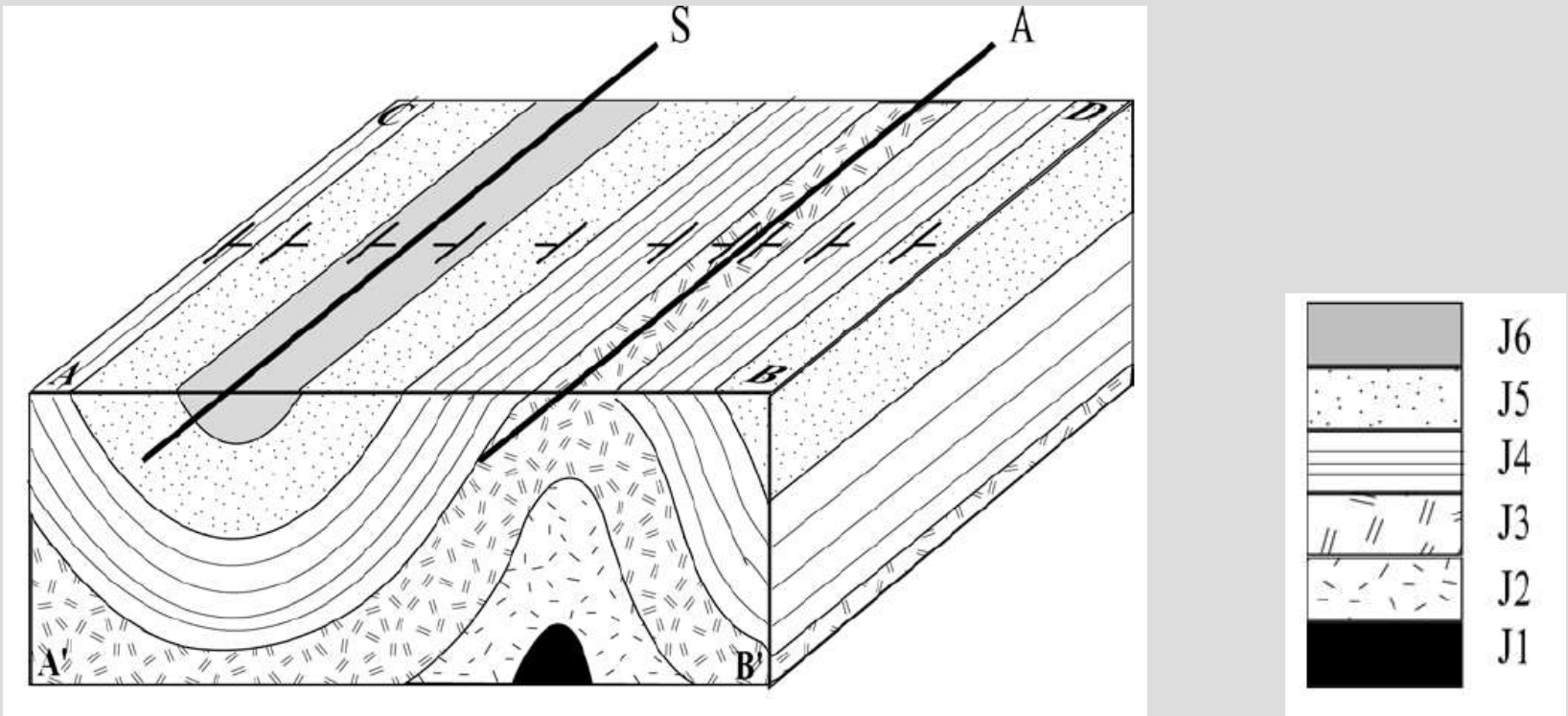
e_1 : 250 m

c_7 : 200 m

Exercice 4.

On considère la structure plissée représentée sur la figure ci-contre. Les traits S et A matérialisent l'intersection entre l'horizontale (surface topographique ici) et un plan vertical passant au cœur de chaque pli.

→ **Comparer les caractéristiques des deux plis à partir des informations données par la représentation cartographique** (portées en surface sur le bloc-diagramme).

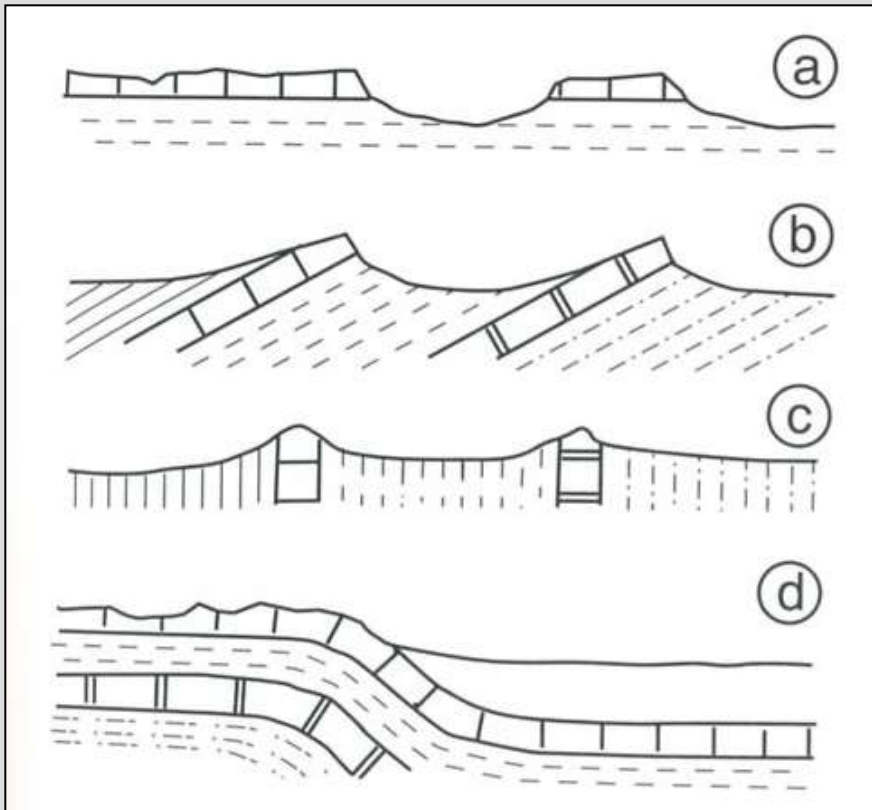


S est placé sur un **pli synclinal**, A sur un **pli anticlinal**

→ **Comment repèrerez-vous désormais un pli sur une carte géologique ?**

→ **Comment déterminerez-vous s'il s'agit d'un pli anticlinal ou synclinal ?**

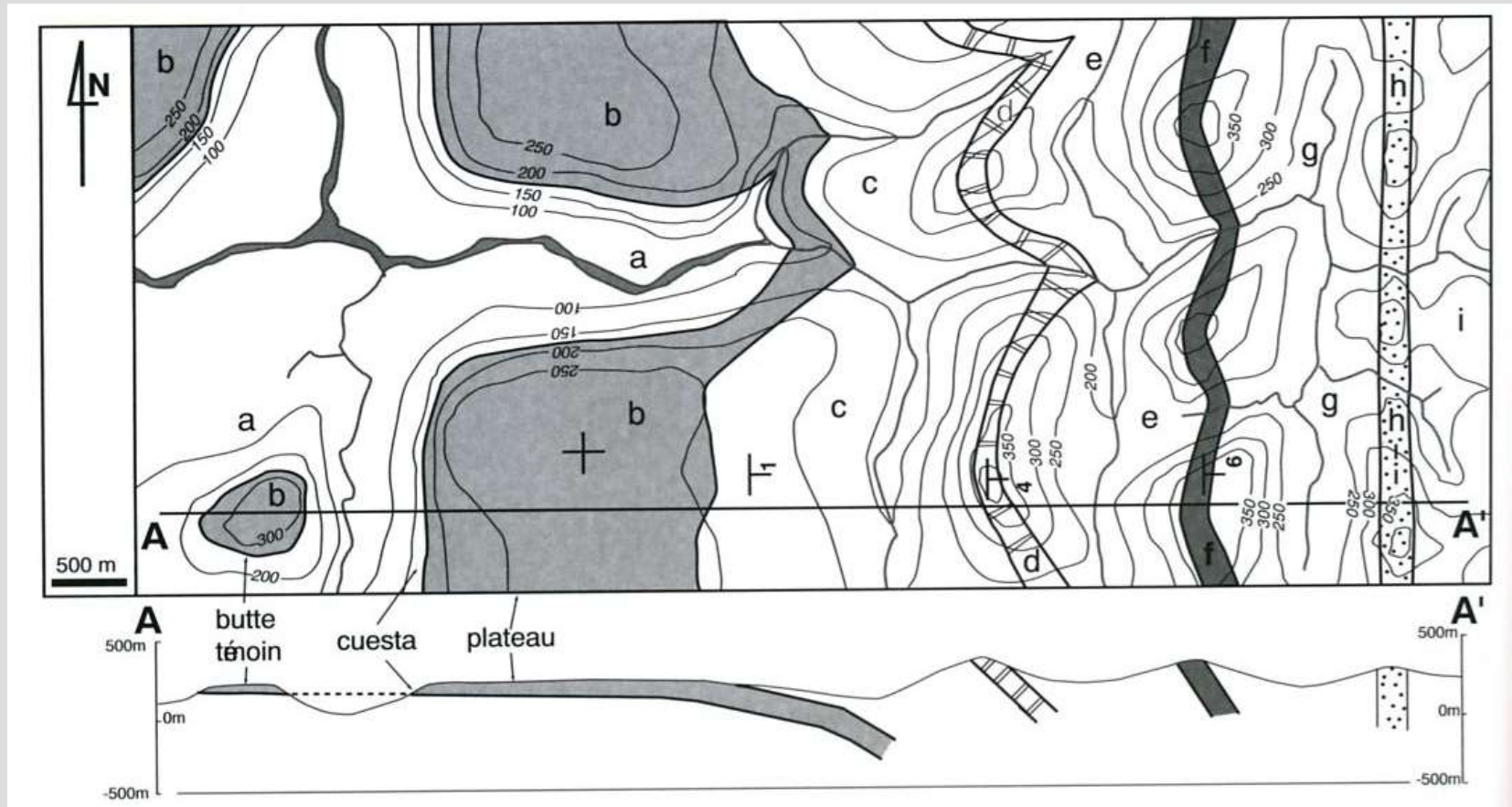
Les principales structures géologiques à l'échelle de la carte



Exemples de structures tabulaires et monoclinales :

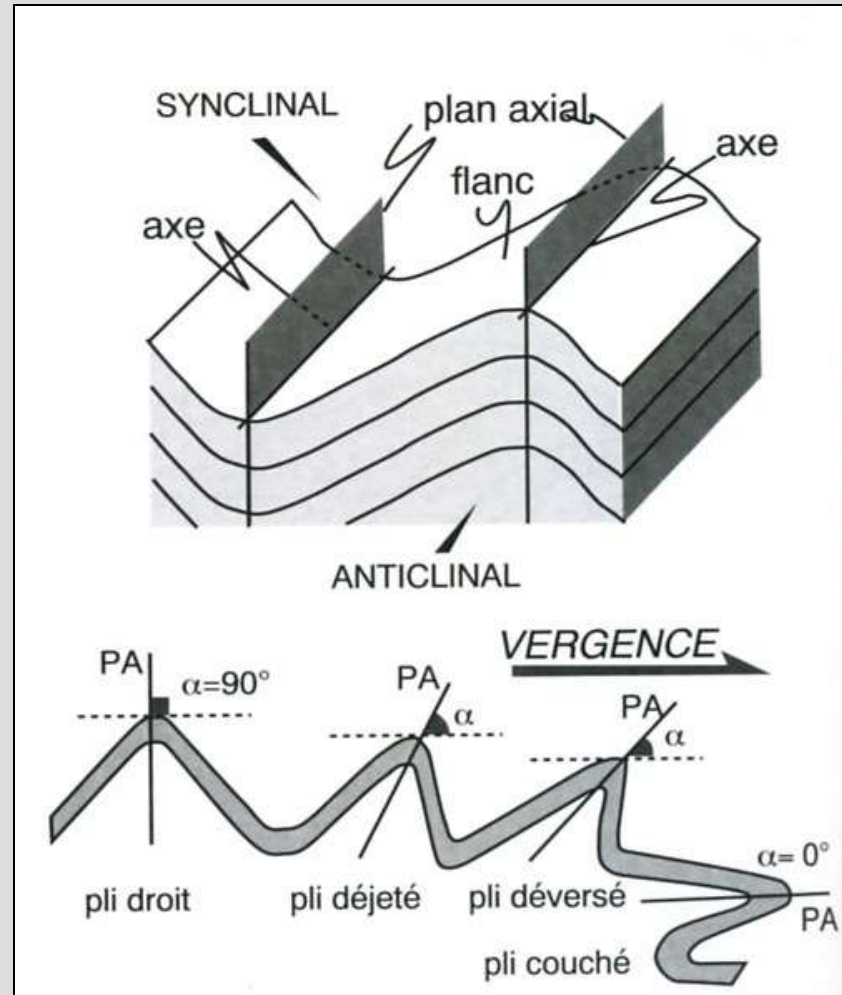
- a. Structure tabulaire
- b. Structure monoclinale.
- c. Structure monoclinale verticale.
- d. Pli monoclinal.

Les principales structures géologiques à l'échelle de la carte



Structures tabulaires et monoclinales : carte et coupe schématiques.

Les principales structures géologiques à l'échelle de la carte



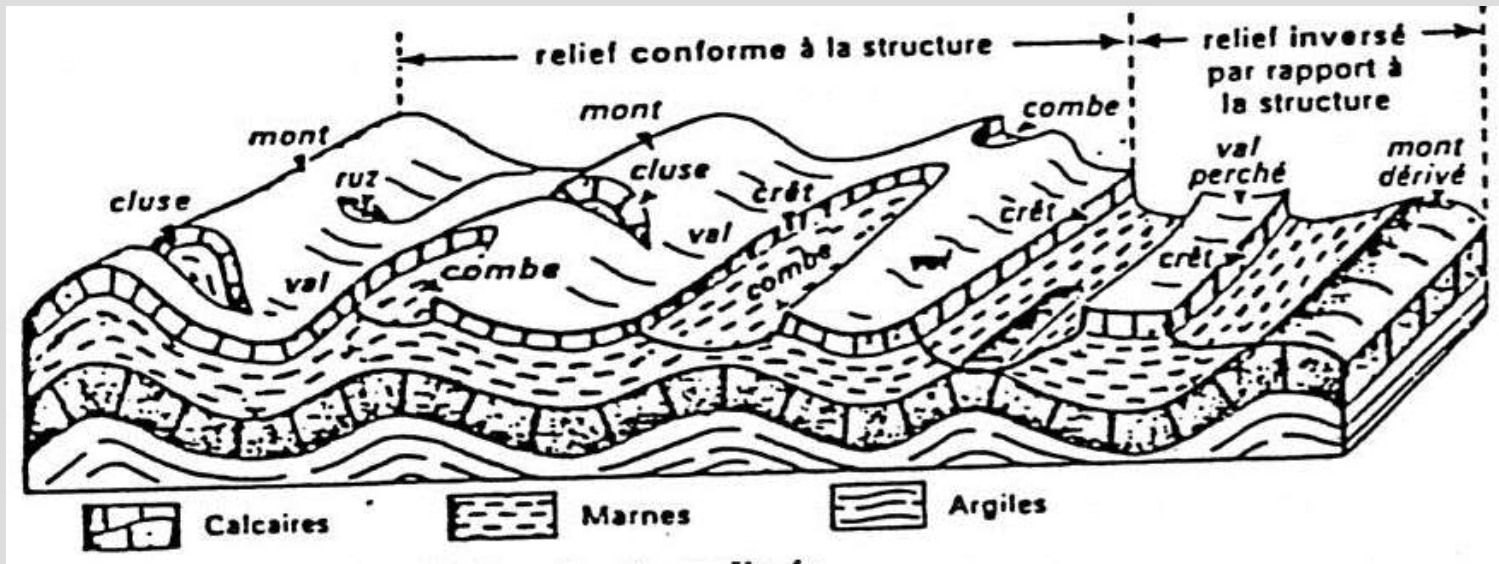
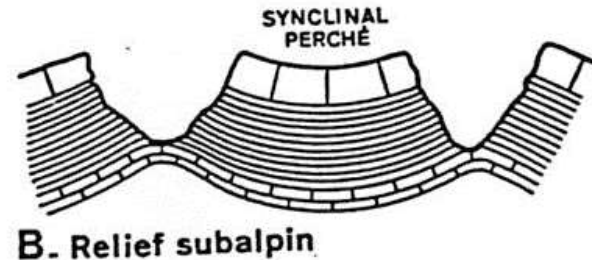
Structures plissées : terminologie

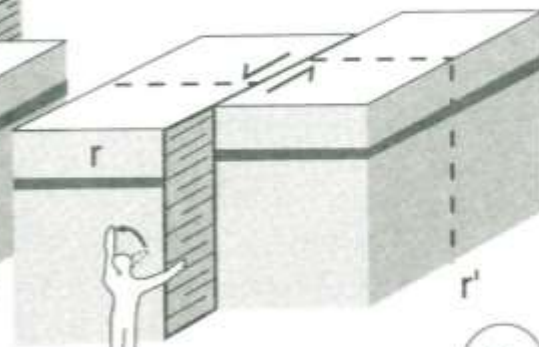
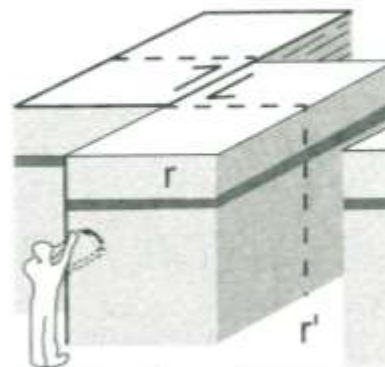
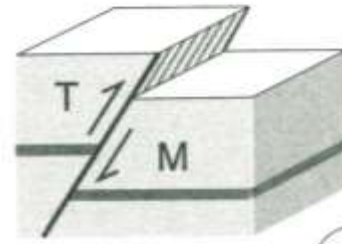
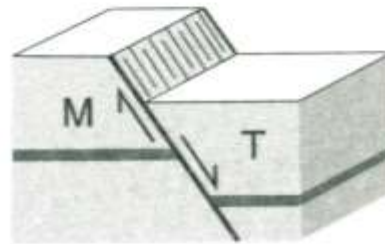
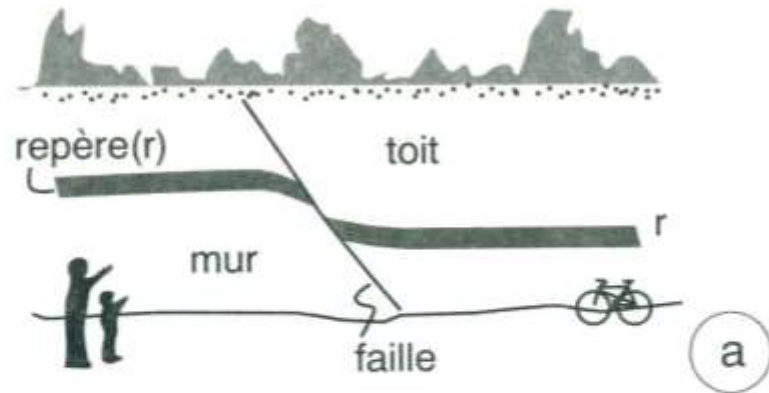
Les principales structures géologiques à l'échelle de la carte



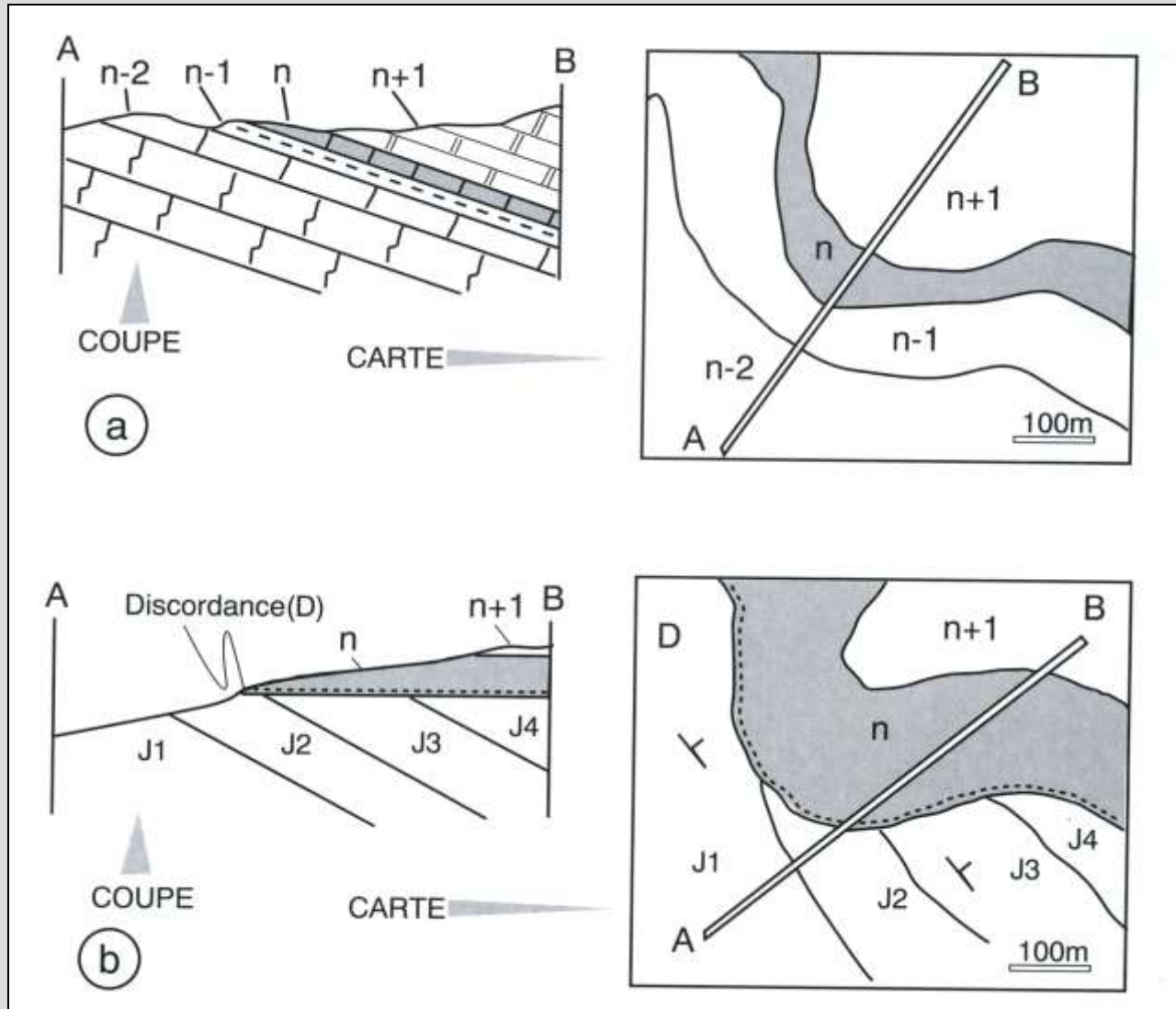
Structure plissée : carte et coupe schématique

Les formes du relief en structure plissée : relief jurassien et subalpin, relief conforme et relief inversé par rapport à la structure



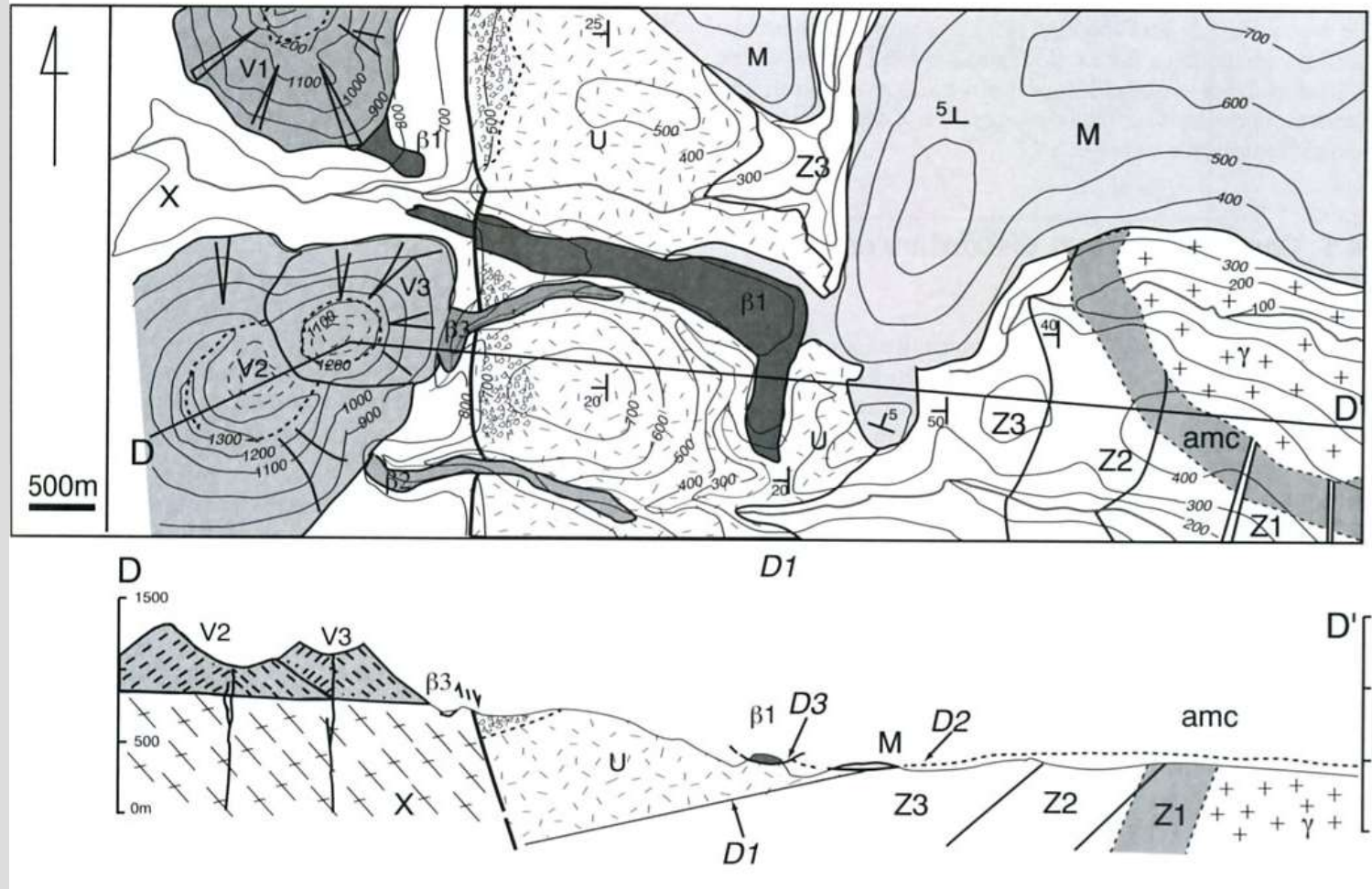


Failles : terminologie



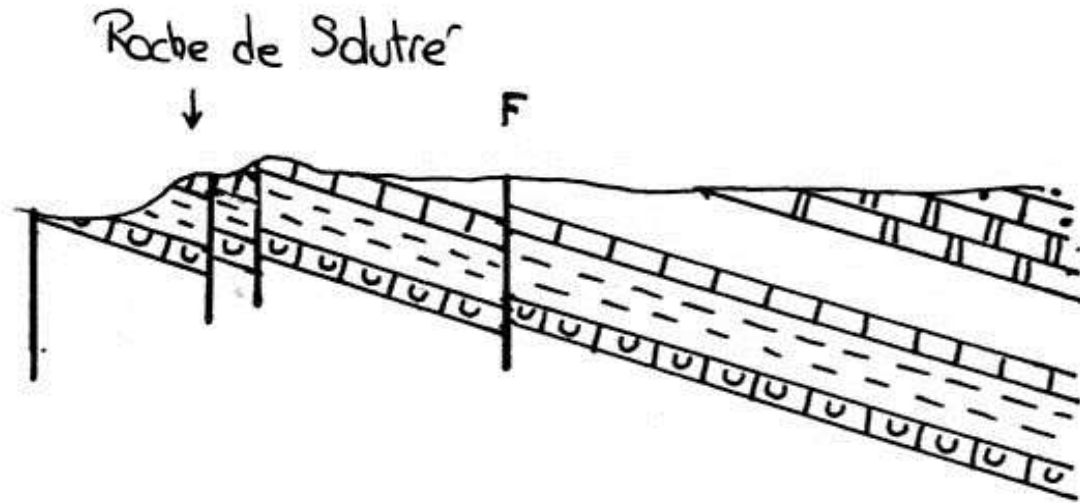
Concordances et discordances : carte et coupe schématique

Les principales structures géologiques à l'échelle de la carte

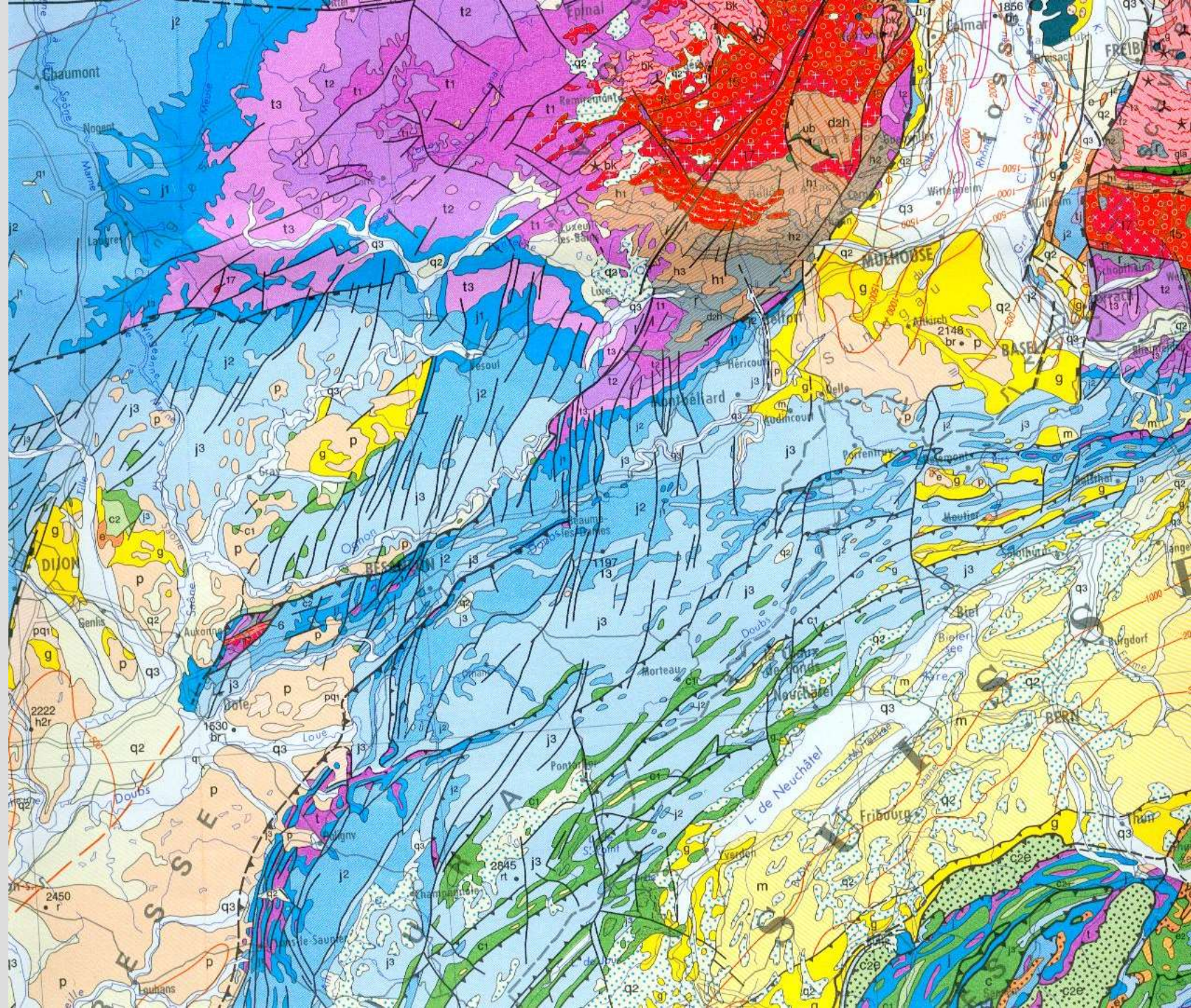


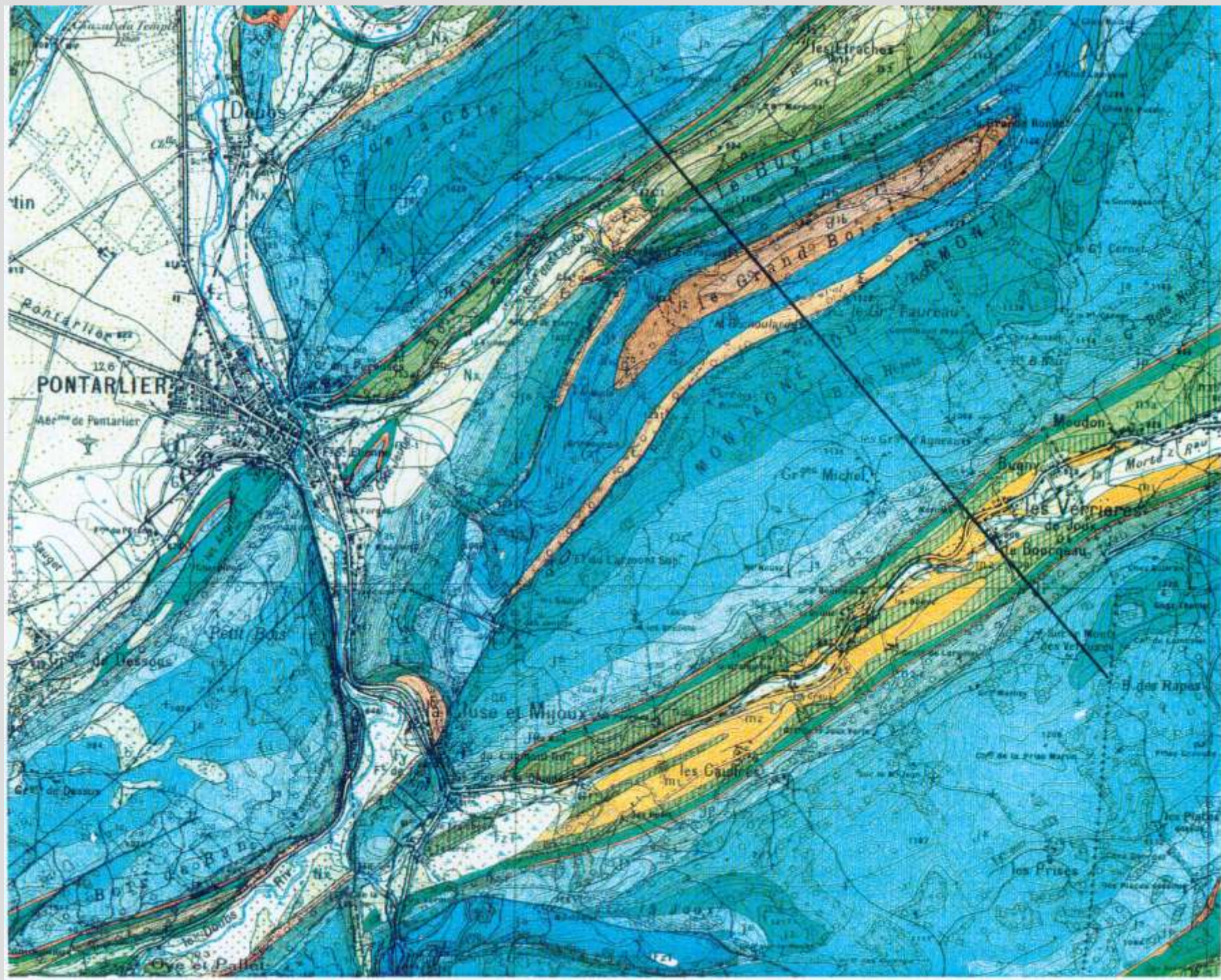
Structure plutonique et volcanique : carte et coupe schématique

Coupe à main levée Gorge au Loup - La Patte d'Oie

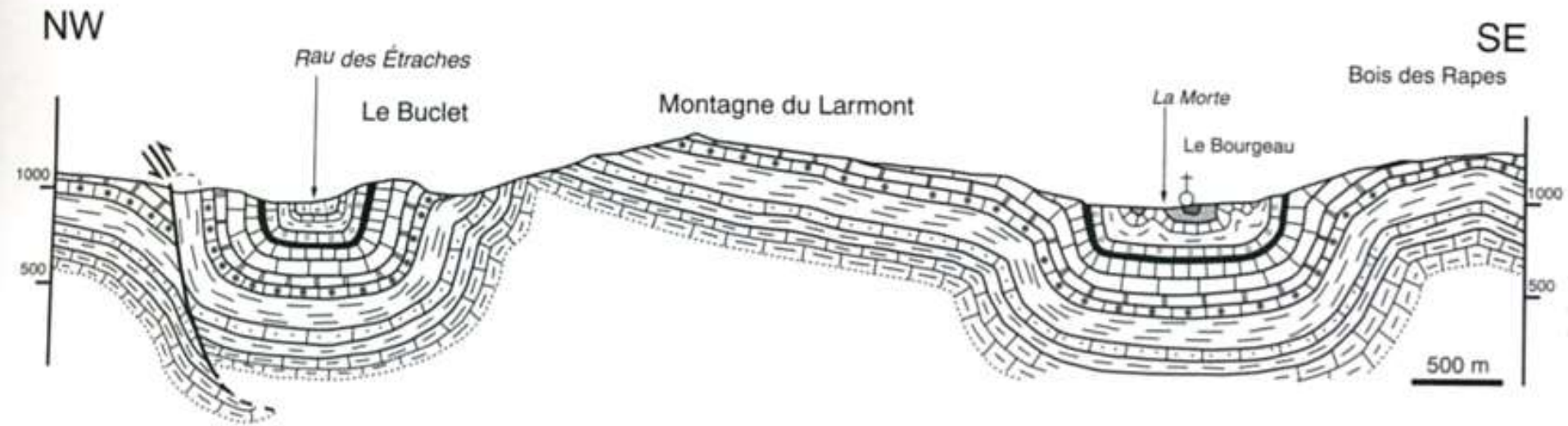


-  m₄ conglomérat
-  J₃₋₆ calcaires
-  J₂ marnes et calcaires
-  J₁ calcaires
-  l_{6a-4} marnes
-  l₃ calcaires à gryphées





Coupe NW-SE dans la région de Pontarlier, sur la carte au 1 / 50 000^e





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	
			Pleistocene	"Ionian"	0.781	
			Calabrian		1.806	
			Gelasian		2.588	
		Pliocene	Placenzian		3.600	
			Zanclean		5.332	
			Messinian		7.246	
		Neogene	Tortonian		11.608	
			Serravalian		13.82	
			Langhian		15.97	
			Burdigalian		20.43	
			Aquitania		23.03	
		Oligocene	Chattian		28.4 ± 0.1	
			Rupelian		33.9 ± 0.1	
			Priabonian		37.2 ± 0.1	
			Bartonian		40.4 ± 0.2	
	Paleogene	Eocene	Lutetian		48.6 ± 0.2	
			Ypresian		55.8 ± 0.2	
			Thanetian		56.7 ± 0.2	
		Paleocene	Selandian		- 61.1	
			Danian		65.5 ± 0.3	
			Maastrichtian		70.6 ± 0.6	
		Upper	Campanian		83.5 ± 0.7	
			Santonian		85.8 ± 0.7	
			Coniacian		- 88.6	
			Turonian		93.6 ± 0.8	
	Mesozoic	Cretaceous	Cenomanian		99.6 ± 0.9	
			Albian		112.0 ± 1.0	
			Aptian		125.0 ± 1.0	
			Barremian		130.0 ± 1.5	
			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	
				Aalenian	171.6 ± 3.0	
			Lower	Toarcian	175.6 ± 2.0	
				Pienstachian	183.0 ± 1.5	
				Sinemurian	189.6 ± 1.5	
				Hettangian	196.5 ± 1.0	
	Triassic	Triassic	Upper	Rhaetian	199.6 ± 0.6	
				Norian	203.6 ± 1.5	
				Carnian	- 228.7	
			Middle	Ladinian	237.0 ± 2.0	
				Anisian	- 245.9	
			Lower	Olenekian	- 249.5	
				Induan	251.0 ± 0.4	
				Changhsingian	253.8 ± 0.7	
			Lopingian	Wuchapingian	260.4 ± 0.7	
				Capitanian	265.8 ± 0.7	
	Paleozoic	Permian	Guadalupian	Wordian	268.0 ± 0.7	
				Roadian	270.6 ± 0.7	
				Kungurlian	275.6 ± 0.7	
			Cisuralian	Artinskian	284.4 ± 0.7	
				Sakmarian	294.6 ± 0.8	
				Asselian	299.0 ± 0.8	
				Gzhelian	303.4 ± 0.9	
			Upper	Kasimovian	307.2 ± 1.0	
				Moscovian	311.7 ± 1.1	
			Lower	Bashkirian	318.1 ± 1.3	
				Serpukhovian	328.3 ± 1.6	
	Carboniferous	Carboniferous	Upper	Visean	345.3 ± 2.1	
				Tournaisian	359.2 ± 2.5	
			Middle			
			Lower			

eonothem Eon	erathem Era	system Period	series Epoch	stage Age	Age Ma	GSSP
Phanerozoic	Paleozoic	Devonian	Upper	Famennian	359.2 ± 2.5	
				Frasnian	374.5 ± 2.6	
				Givetian	385.3 ± 2.6	
			Middle	Eifelian	391.8 ± 2.7	
				Emasian	397.5 ± 2.7	
			Lower	Pragian	407.0 ± 2.8	
				Lochkovian	411.2 ± 2.8	
					416.0 ± 2.8	
		Silurian	Pridoli		418.7 ± 2.7	
			Ludlow	Ludfordian	421.3 ± 2.6	
			Gorstian		422.9 ± 2.5	
			Wenlock	Homerian	426.2 ± 2.4	
			Sheinwoodian		428.2 ± 2.3	
	Ordovician	Ordovician	Upper	Aeronian	439.0 ± 1.8	
				Rhuddanian	443.7 ± 1.5	
				Hirnantian	445.6 ± 1.5	
			Middle	Katian	455.8 ± 1.6	
				Sandbian	460.9 ± 1.6	
			Lower	Darwillian	468.1 ± 1.6	
				Dapingian	471.8 ± 1.6	
				Floian	478.6 ± 1.7	
				Tremadocian	488.3 ± 1.7	
				Stage 10	- 492 *	
	Cambrian	Cambrian	Furongian	Stage 9	- 496 *	
				Paibian	- 499	
				Guzhangian	- 503	
			Series 3	Drumian	- 506.5	
				Stage 5	- 510 *	
			Series 2	Stage 4	- 515 *	
				Stage 3	- 521 *	
	Terreneuvian	Terreneuvian	Fortunian	Stage 2	- 528 *	
				Fortunian	542.0 ± 1.0	

eonothem Eon	erathem Era	system Period	Age Ma	GSSP
Phanerozoic	Proterozoic	Neo-proterozoic	Ediacaran	- 542
			Cryogenian	- 635
			Tonian	850
		Meso-proterozoic	Stenian	1000
			Ectasian	1200
			Calymnian	1400
		Paleo-proterozoic	Statherian	1600
			Orosinian	1800
			Rhyacian	2050
			Siderian	2300
	Archean	Neoproterozoic	2500	
			2800	
		Mesoarchean	3200	
			3600	
		Paleoarchean	4000	
			4600	
		Eoarchean		
	Hadean (informal)	Hadean (informal)		

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 Standard 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).

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.cgmw.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 (in press).

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

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* The status of the Quaternary is not yet decided. Its base may be assigned as the base of the Gelasian and extend the base of the Pleistocene to 2.6 Ma. The "Tertiary" comprises the Paleogene and Neogene and has no official rank.