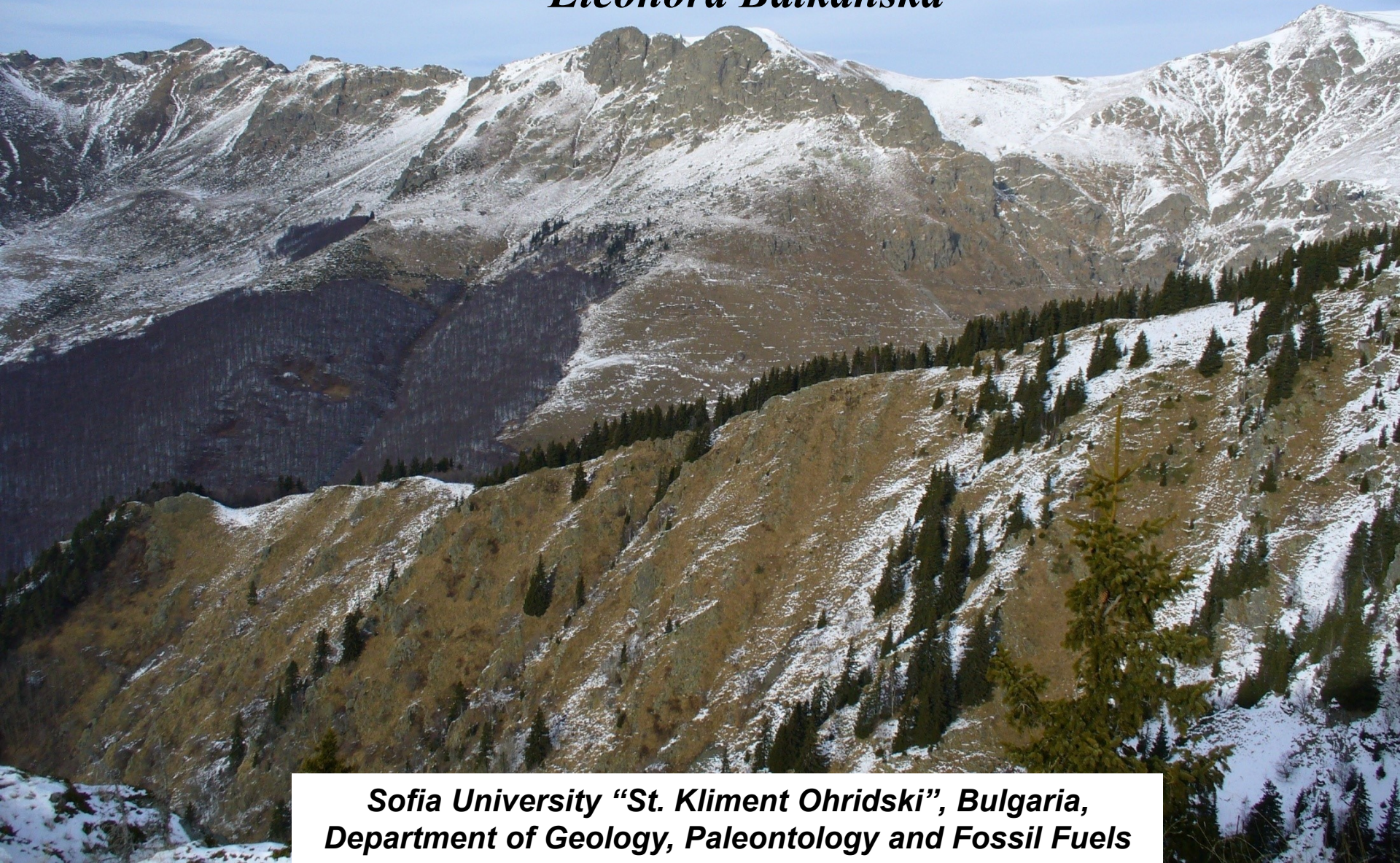




Main stages of the geological evolution of the territory of Bulgaria

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Presentation

- **International chronostratigraphic chart and main geological periods**
- **Geological evolution of Bulgaria in Late Proterozoic to Early Paleozoic**
- **Geological evolution of Bulgaria in Late Paleozoic**
- **Alpine geological evolution of Bulgaria (during Mesozoic and Cenozoic)**
- **Position of the territory of Bulgaria in the Alpine orogeny**
- **Contemporary geodynamics of the territory of Bulgaria**

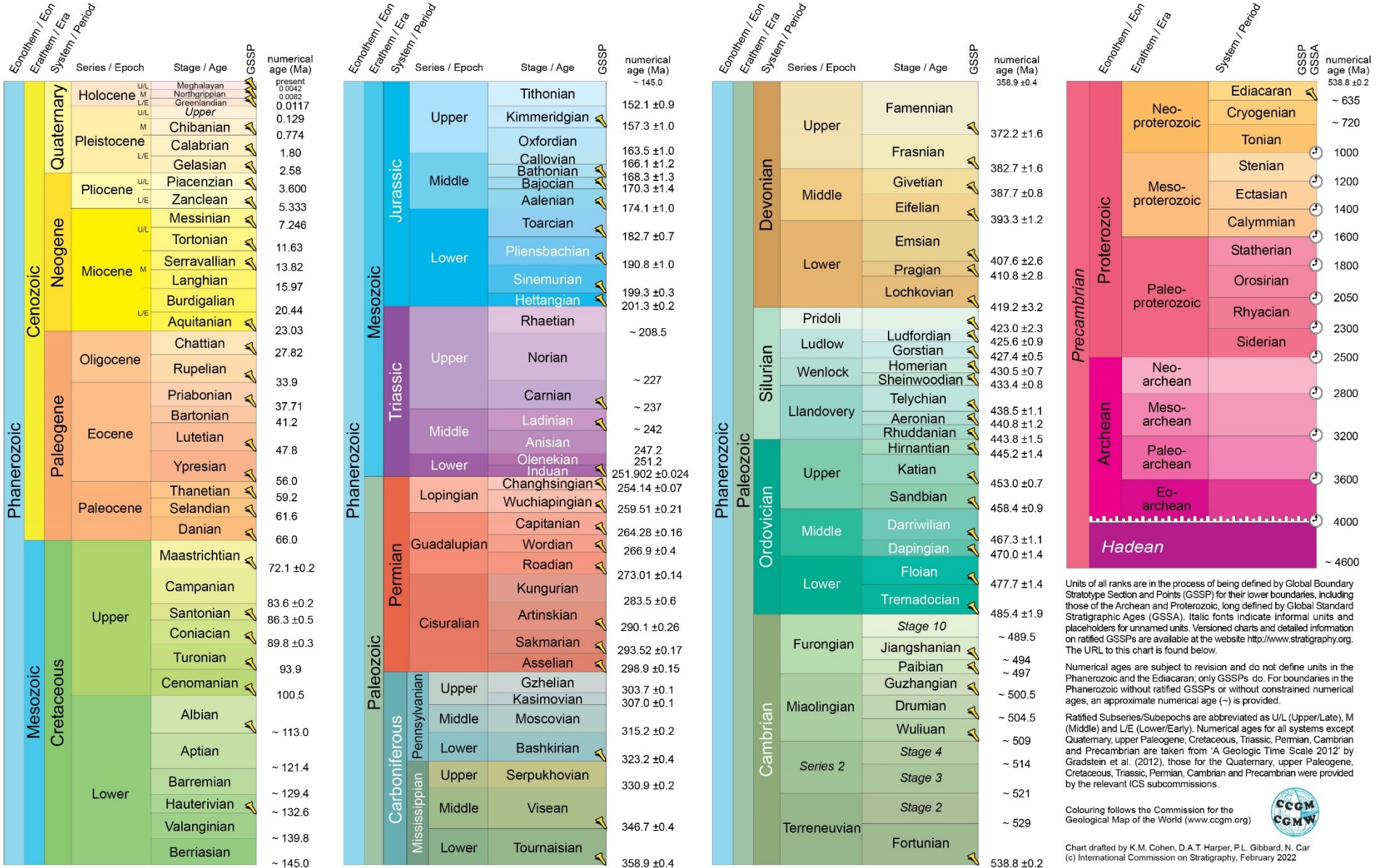


INTERNATIONAL CHRONOSTRATIGRAPHIC CHART

www.stratigraphy.org

International Commission on Stratigraphy

v 2022/02



Units of all ranks are in the process of being defined by Global Boundary Stratotype Section and Points (GSSP) for their lower boundaries, including those of the Archean and Proterozoic, long defined by Global Standard Stratigraphic Ages (GSSA). Italic fonts indicate informal units and placeholders for unnamed units. Versioned charts and detailed information on ratified GSSPs are available at the website <http://www.stratigraphy.org>. The URL to this chart is found below.

Numerical ages are subject to revision and do not define units in the Phanerozoic and the Ediacaran; only GSSPs do. For boundaries in the Phanerozoic without ratified GSSPs or without constrained numerical ages, an approximate numerical age (~) is provided.

Ratified Subseries/Subepochs are abbreviated as U/L (Upper/Late), M (Middle) and L/E (Lower/Early). Numerical ages for all systems except Quaternary, upper Paleogene, Cretaceous, Triassic, Permian, Cambrian and Precambrian are taken from 'A Geologic Time Scale 2012' by Gradstein et al. (2012), those for the Quaternary, upper Paleogene, Cretaceous, Triassic, Permian, Cambrian and Precambrian were provided by the relevant ICS subcommissions.

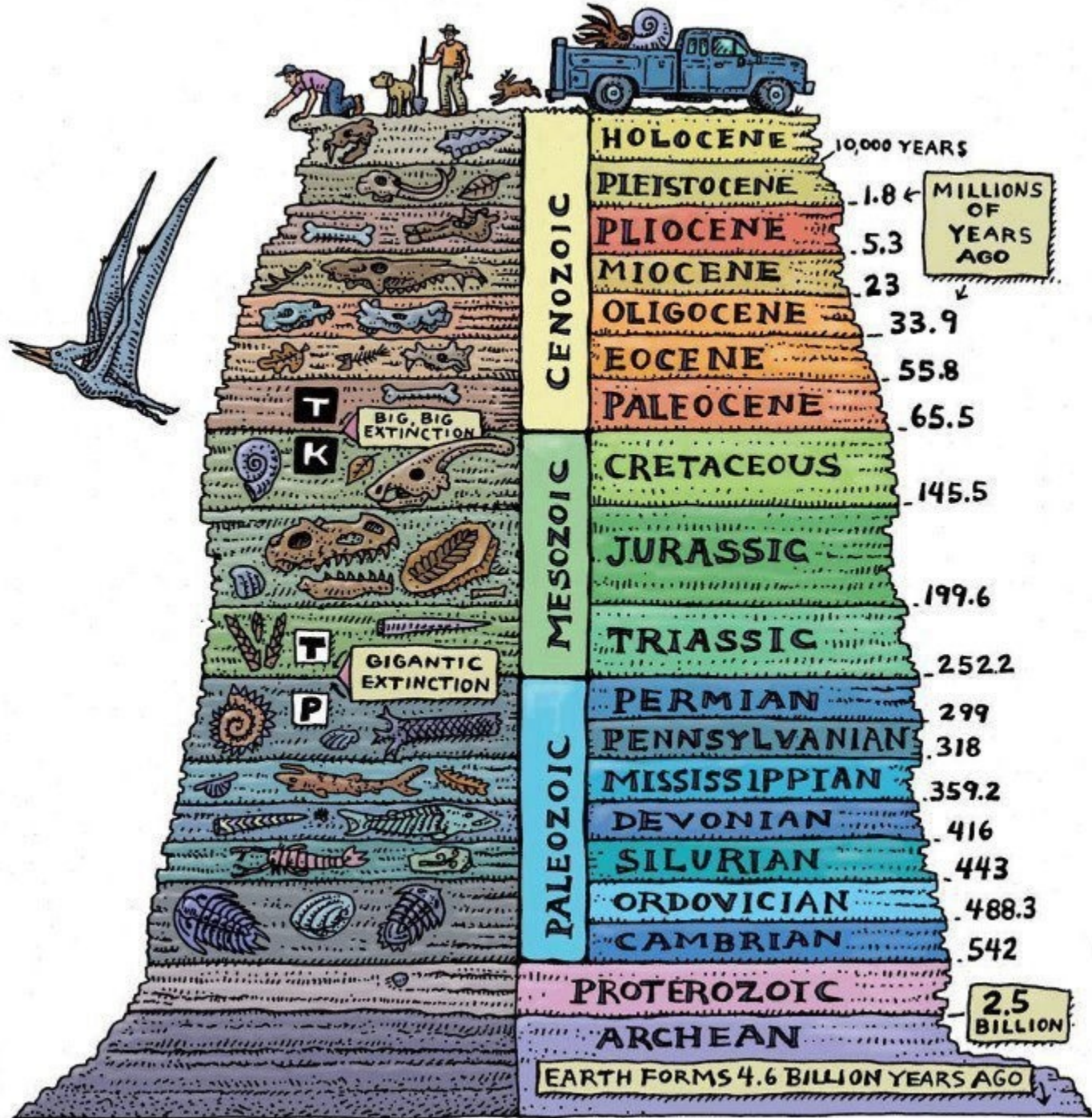
Colouring follows the Commission for the Geological Map of the World (www.ccgw.org)



Chart drafted by K.M. Cohen, D.A.T. Harper, P.L. Gibbard, N. Car (c) International Commission on Stratigraphy, February 2022

To cite: Cohen, K.M., Finney, S.C., Gibbard, P.L. & Fan, J.-X. (2013): updated! The ICS International Chronostratigraphic Chart. Episodes 36: 199-204.

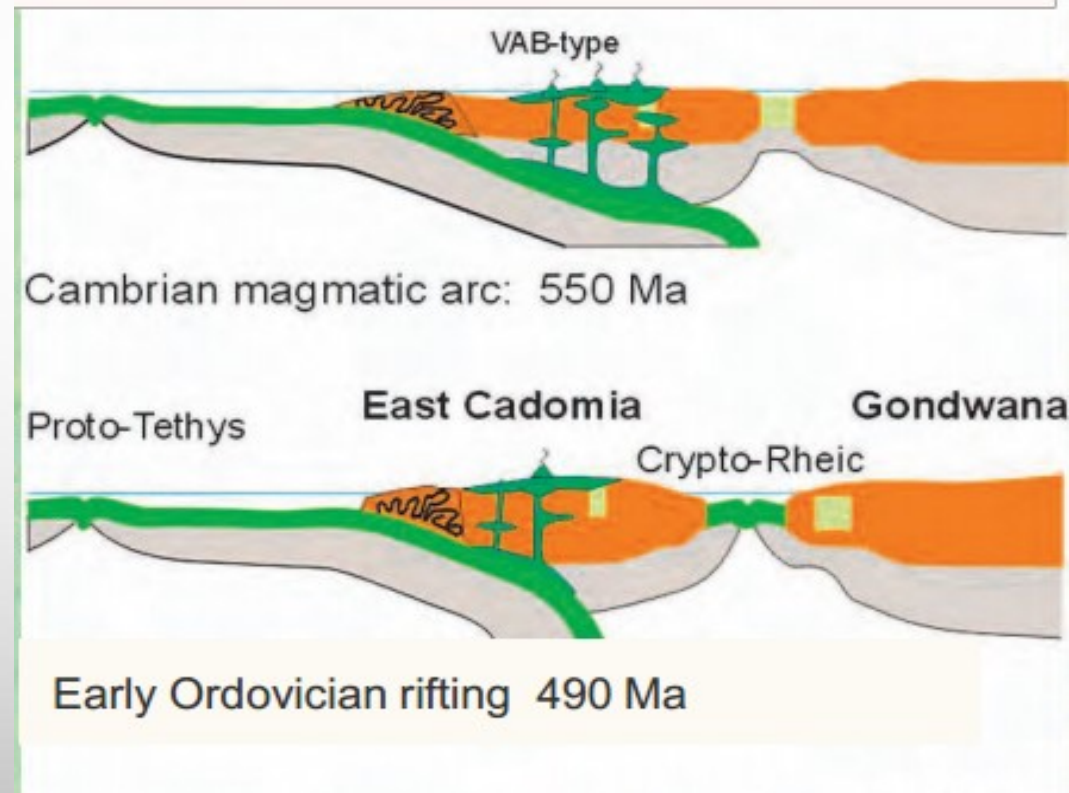
URL: <http://www.stratigraphy.org/ICSchart/ChronostratChart2022-02.pdf>



Geological evolution of Bulgaria in the Late Proterozoic and the Early Paleozoic

- Fragments of metamorphic rocks that a result of the Cadomian orogeny (650–550 Ma) – along the Gondwana periphery, collisions of island arcs and accretion in subduction setting
- Fragments related to the Cadomian orogeny could be traced from Spain to Iran
- They are reworked to different degree by later tectonic events
- Presented by fragments of oceanic crust and the concomitant sediments, arc magmatics, fragments of continental crust

From the Neoproterozoic to the Ordovician **Eastern Alps** after Schulz et al. 2004



Geological evolution of Bulgaria in the Late Proterozoic and the Early Paleozoic



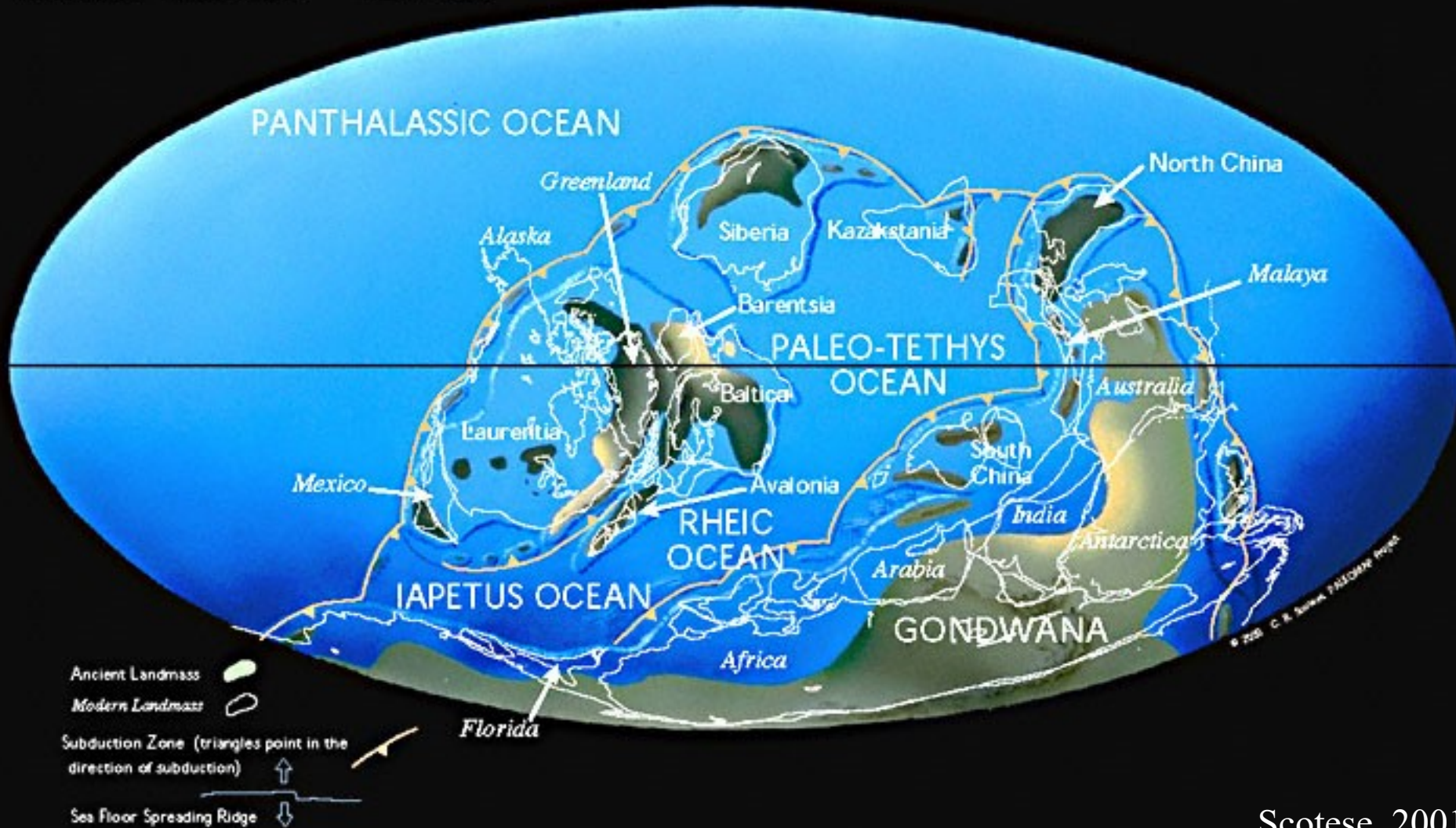
- Vlasina Complex in Western Bulgaria
- Berkovitsa Unit in Stara Planina Mountains
- Frolosh Unit in South-Western Bulgaria
- Diabase-phyllitoid Complex in Iskar Gorge
- Plutons in Stara Planina Mountain

Geological evolution of Bulgaria in the Early Paleozoic



Geological evolution of Bulgaria in the Early Paleozoic

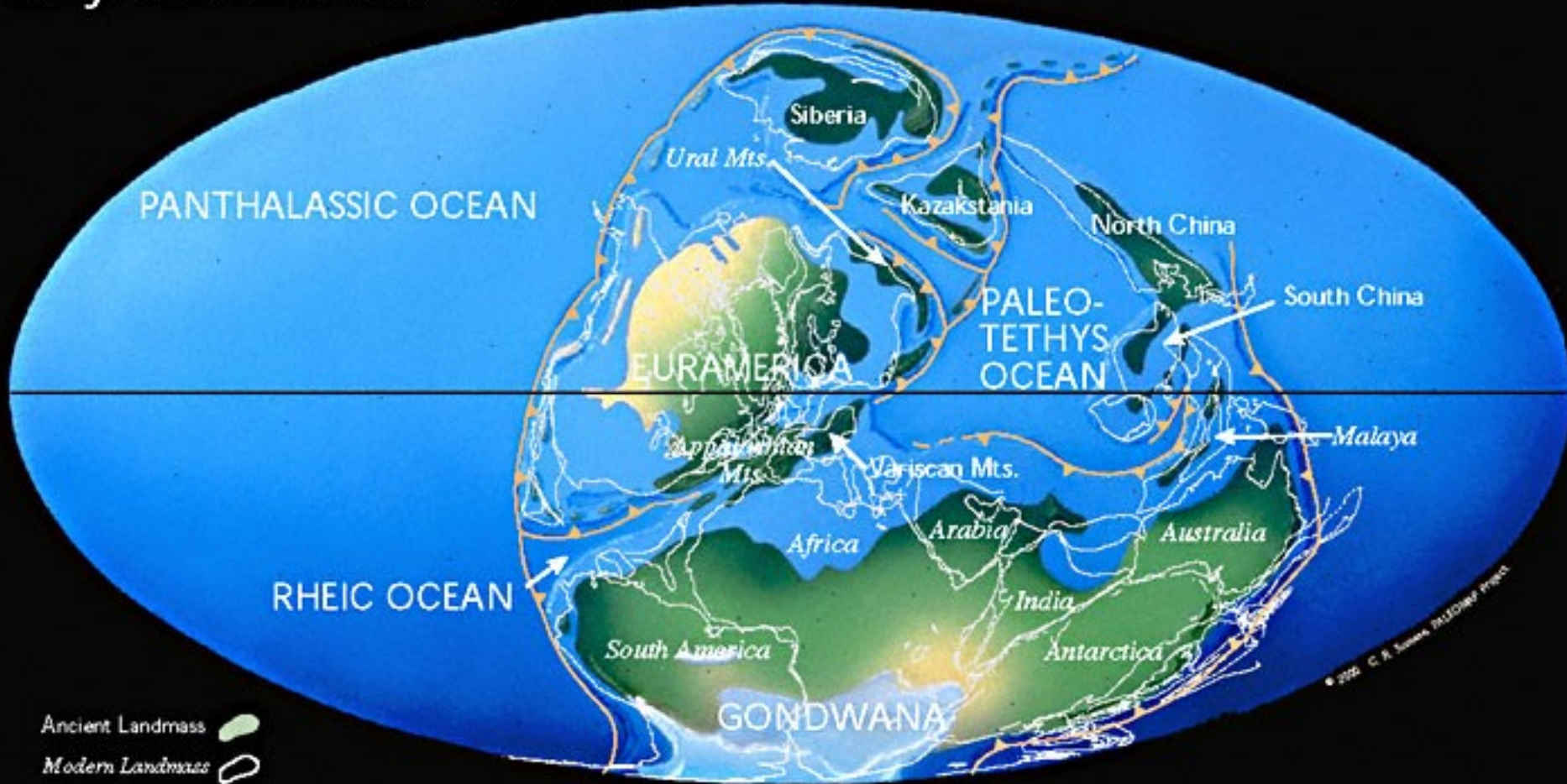
Middle Silurian 425 Ma



Scotese, 2001

Geological evolution of Bulgaria in the Late Paleozoic

Early Carboniferous 356 Ma



Ancient Landmass

Modern Landmass

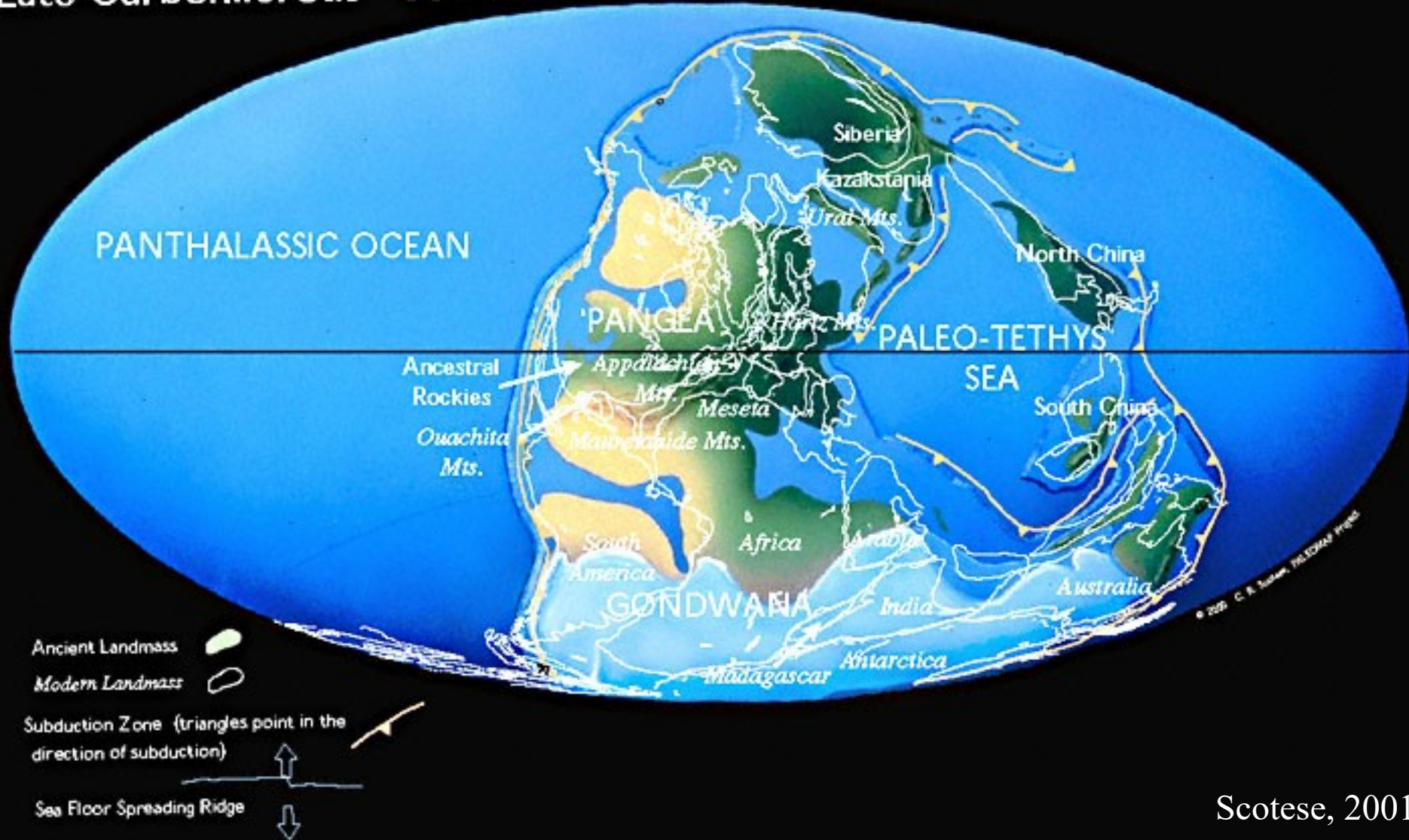
Subduction Zone (triangles point in the direction of subduction)

Sea Floor Spreading Ridge

Scotese, 2001

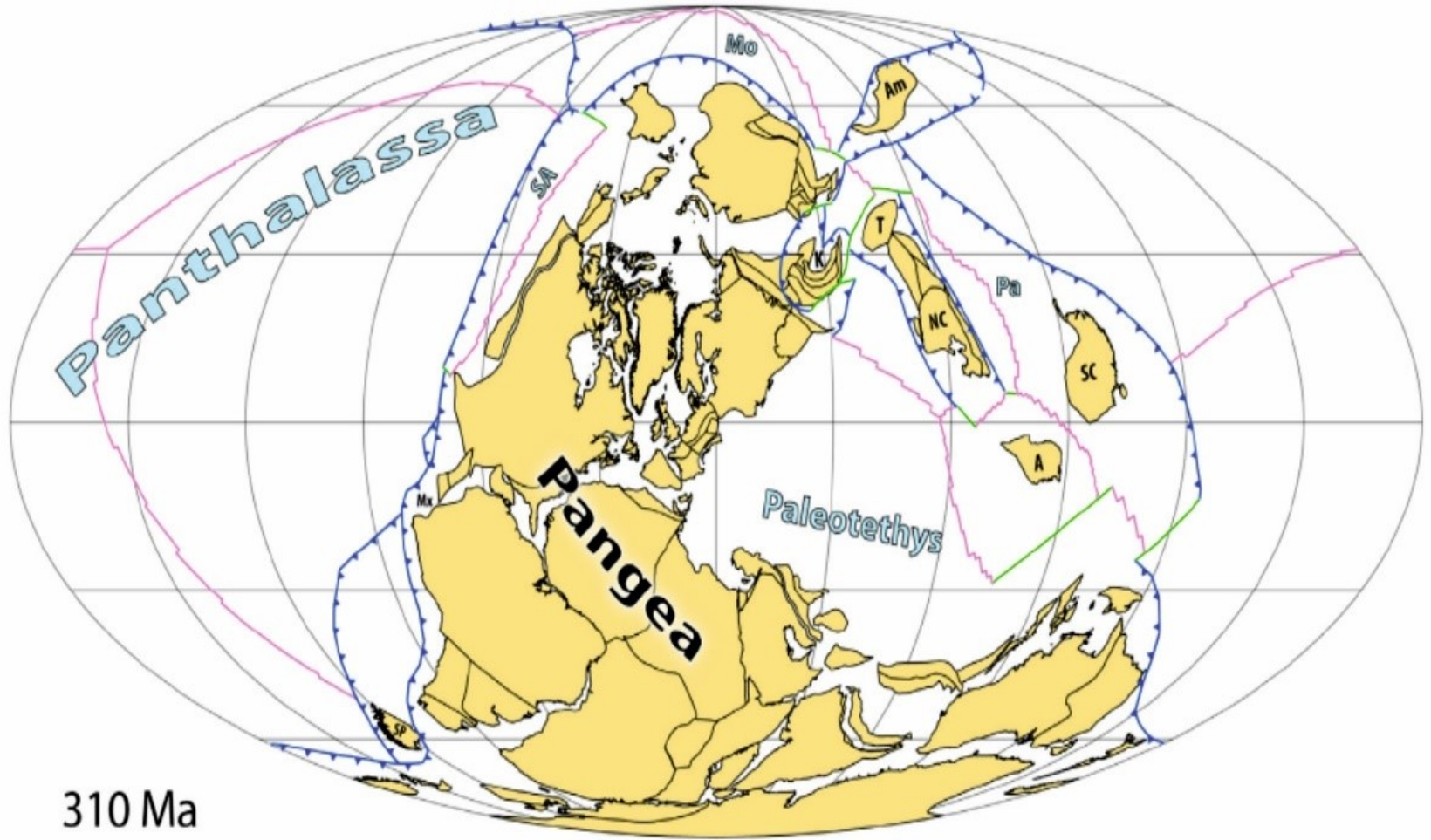
Geological evolution of Bulgaria in the Late Paleozoic

Late Carboniferous 306 Ma



Scotese, 2001

Geological evolution of Bulgaria in the Late Paleozoic



310 Ma

Late Carboniferous

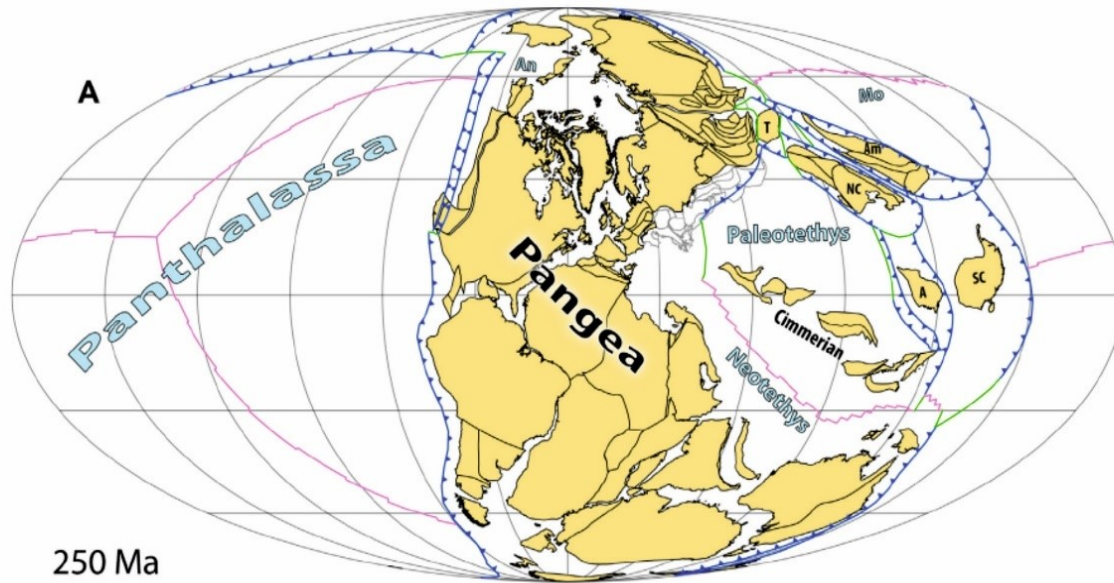
Geological evolution of Bulgaria in the Late Paleozoic



Alpine geological evolution of Bulgaria

- From the Mesozoic to present day
- Related to the evolution of the Tethys ocean
- The Tethys ocean (Neotethys) opened between the south continent Gondwana and the north continent Laurasia during the Triassic
- After the complex evolution of the ocean and its closure during the Cenozoic, the Alpine-Himalayan orogeny was formed

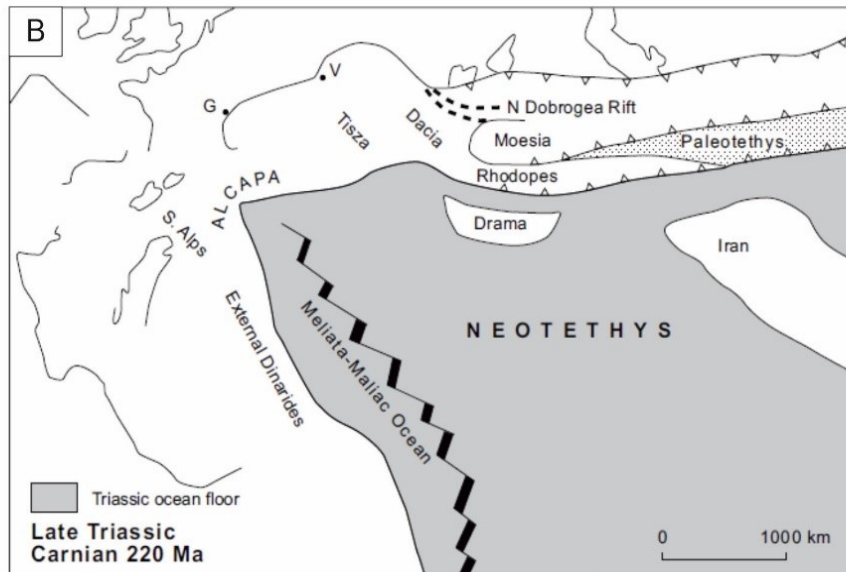
Geological evolution of Bulgaria in the Early Mesozoic



250 Ma
Permo-Triassic

Domier, Torsvik, 2014

The territory of the Mediterranean during the Early Mesozoic has a complex paleogeographical configuration related to the presence of numerous microcontinents separated by narrow basins and oceans.



During the Mesozoic the evolution of these basins is related to rifting processes in Gondwana and Eurasia, breaking off continental fragments and their drift, processes of subduction and thrusting of oceanic lithosphere, collision of continental plates.

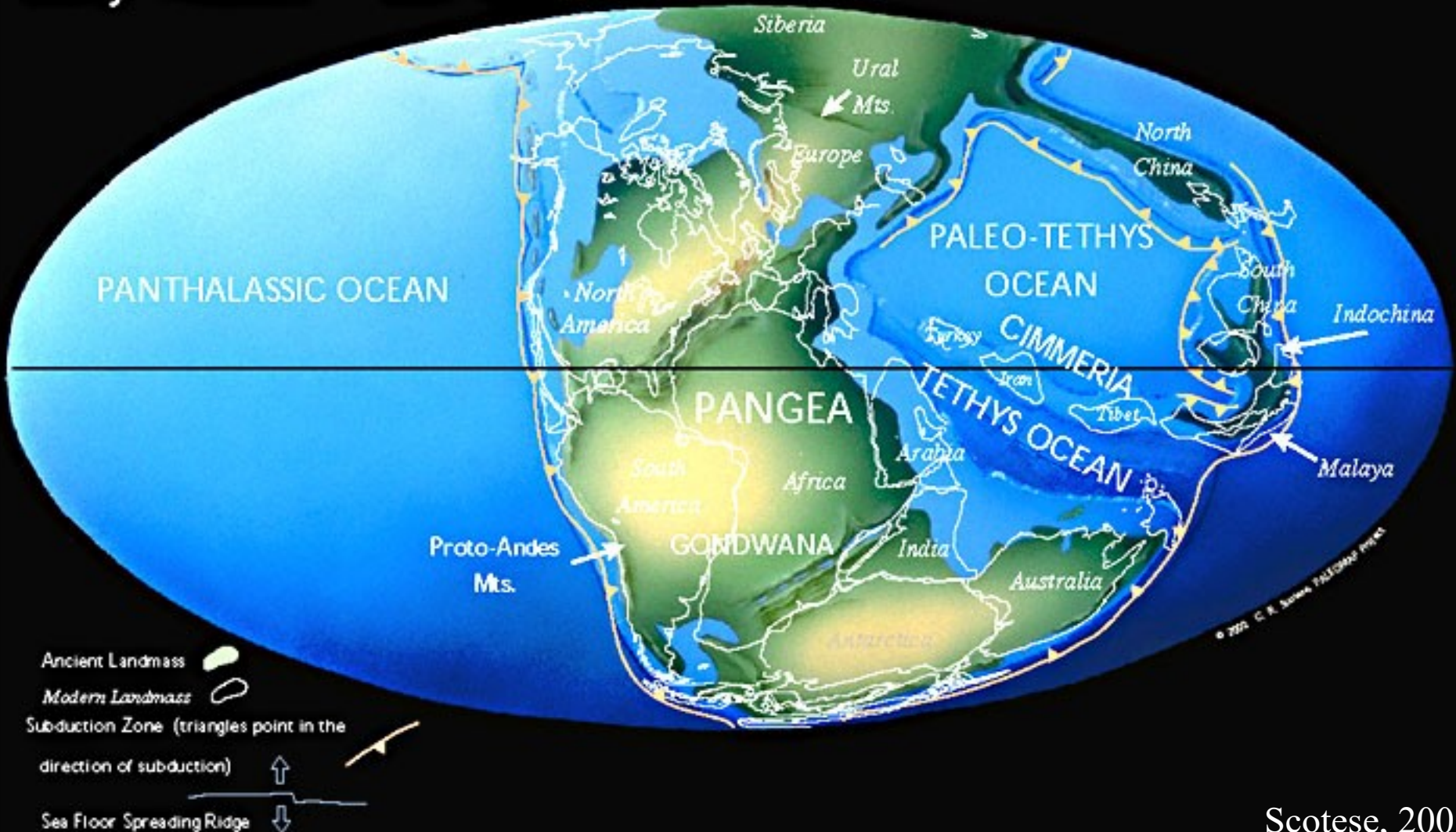
Schmidt et al., 2008

Geological evolution of Bulgaria in the Early Mesozoic



Geological evolution of Bulgaria in the Early Mesozoic

Early Triassic 237 Ma



Scotese, 2001

Geological evolution of Bulgaria in the Jurassic-Early Cretaceous

Late Jurassic 152 Ma



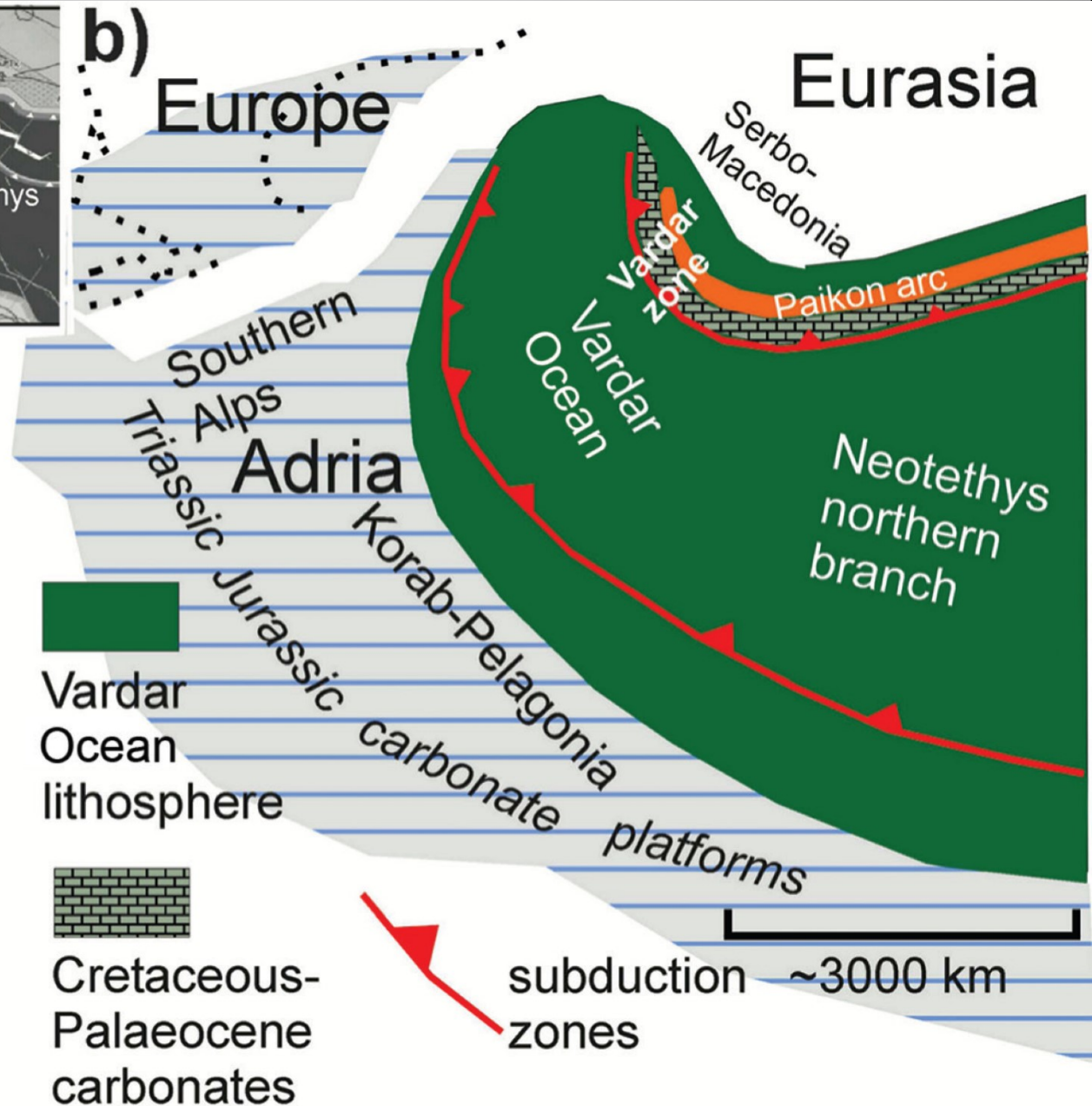
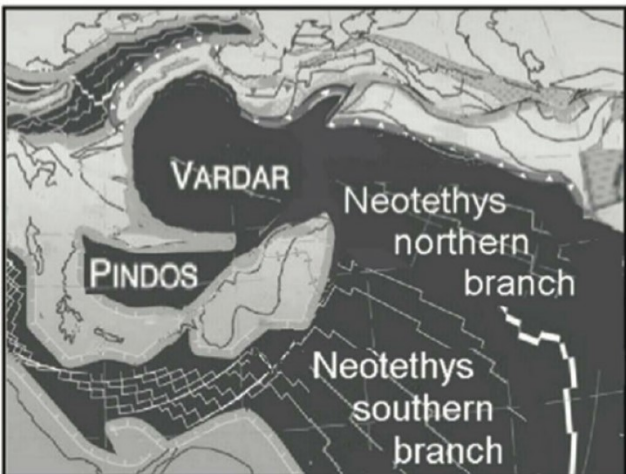
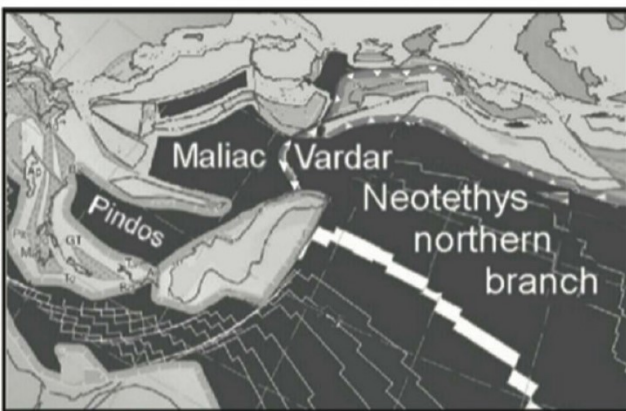
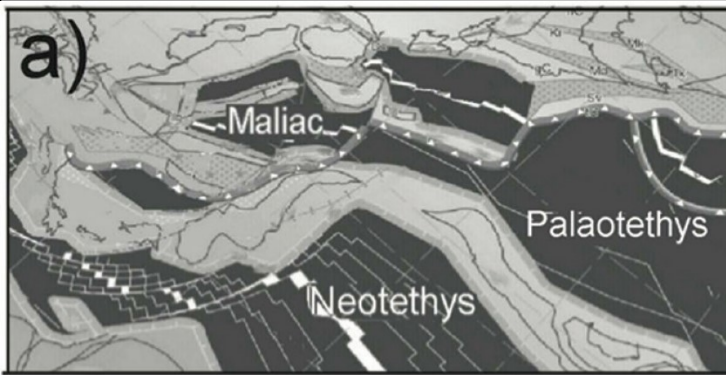
- Ancient Landmass
- Modern Landmass
- Subduction Zone (triangles point in the direction of subduction)
- Sea Floor Spreading Ridge

© 2002 C. R. Scotese, PALEOMAP Pro 4.0

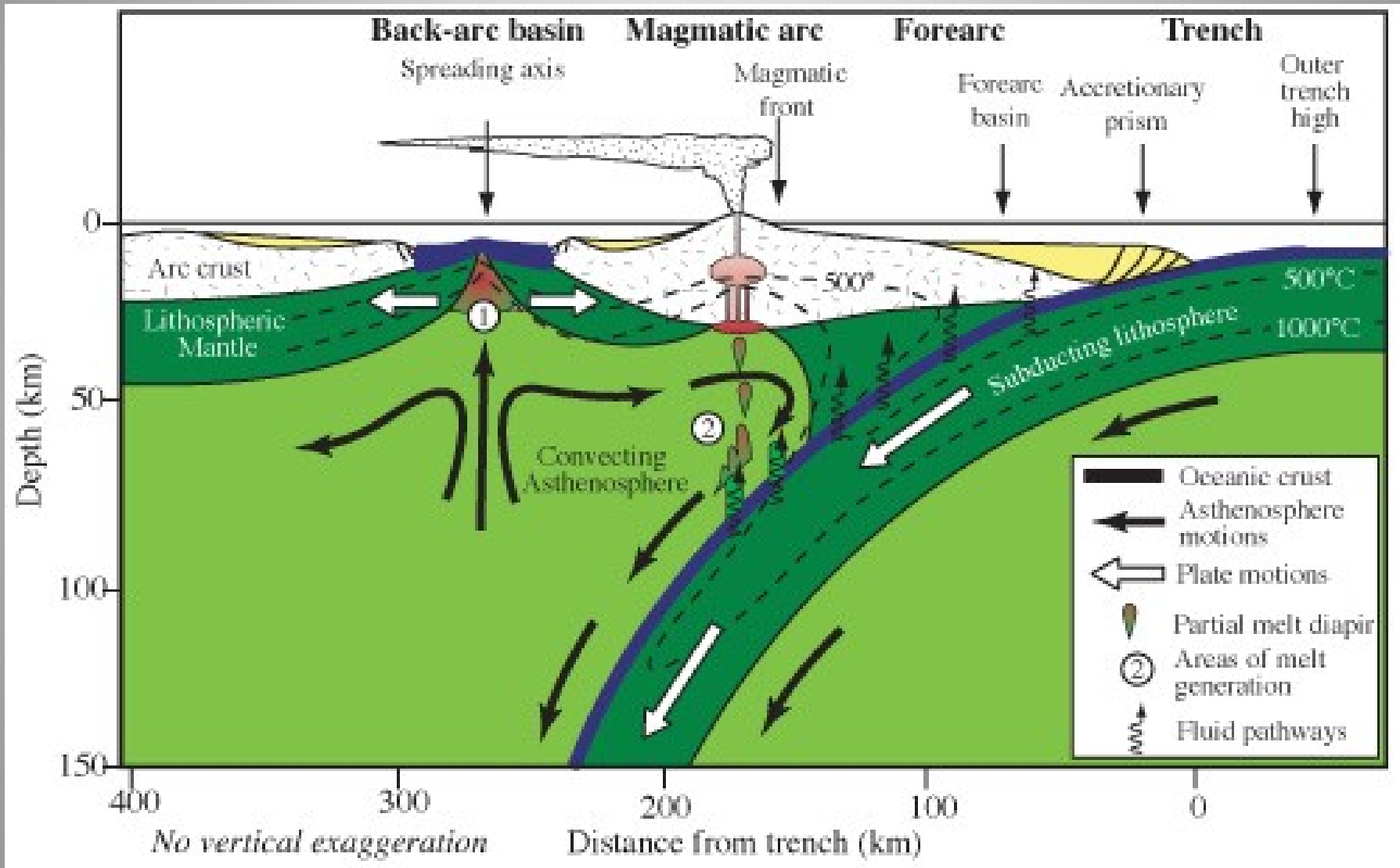
Geological evolution of Bulgaria in the Jurassic-Early Cretaceous



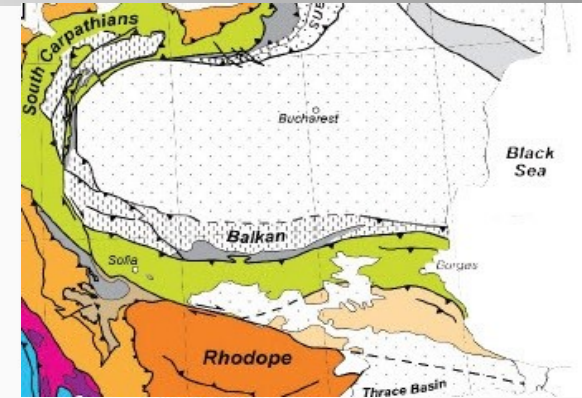
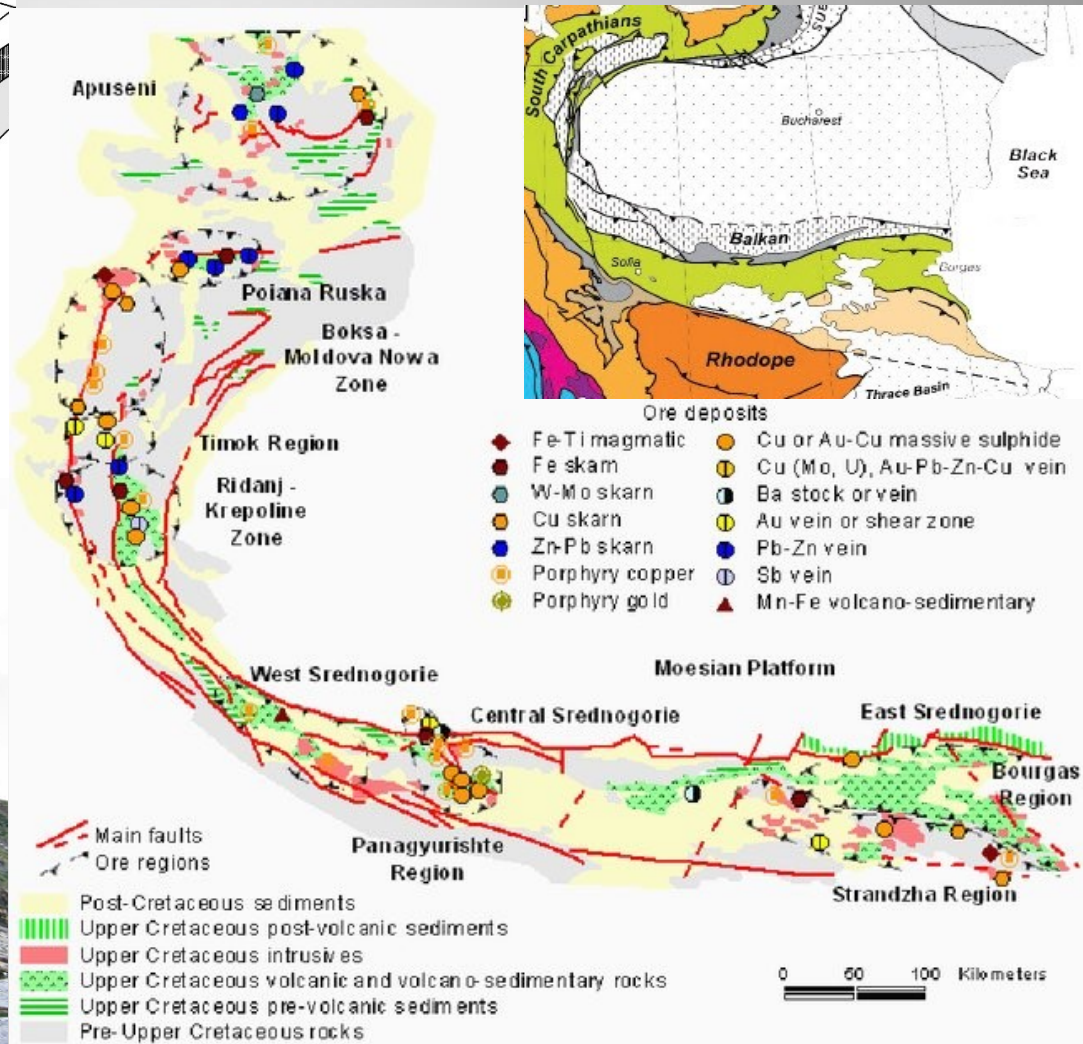
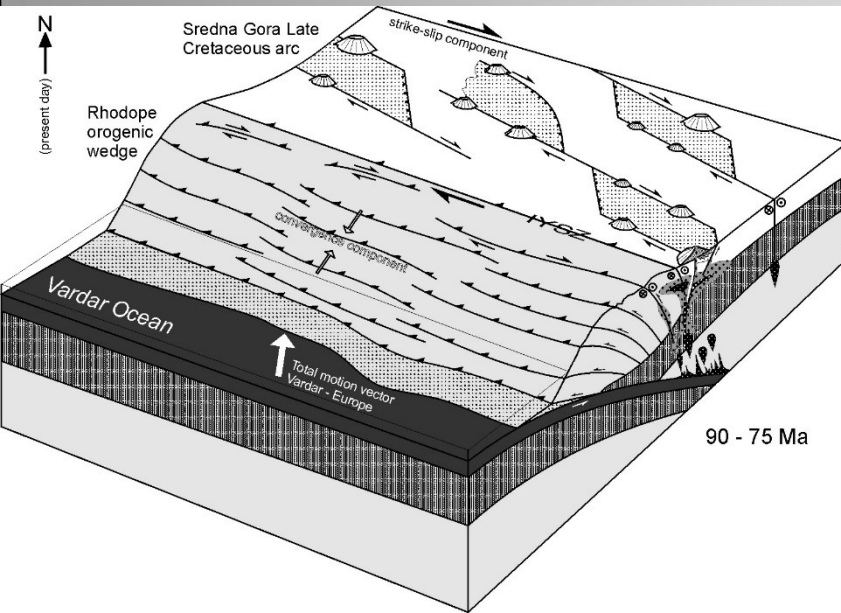
Geological evolution of Bulgaria in the Late Cretaceous



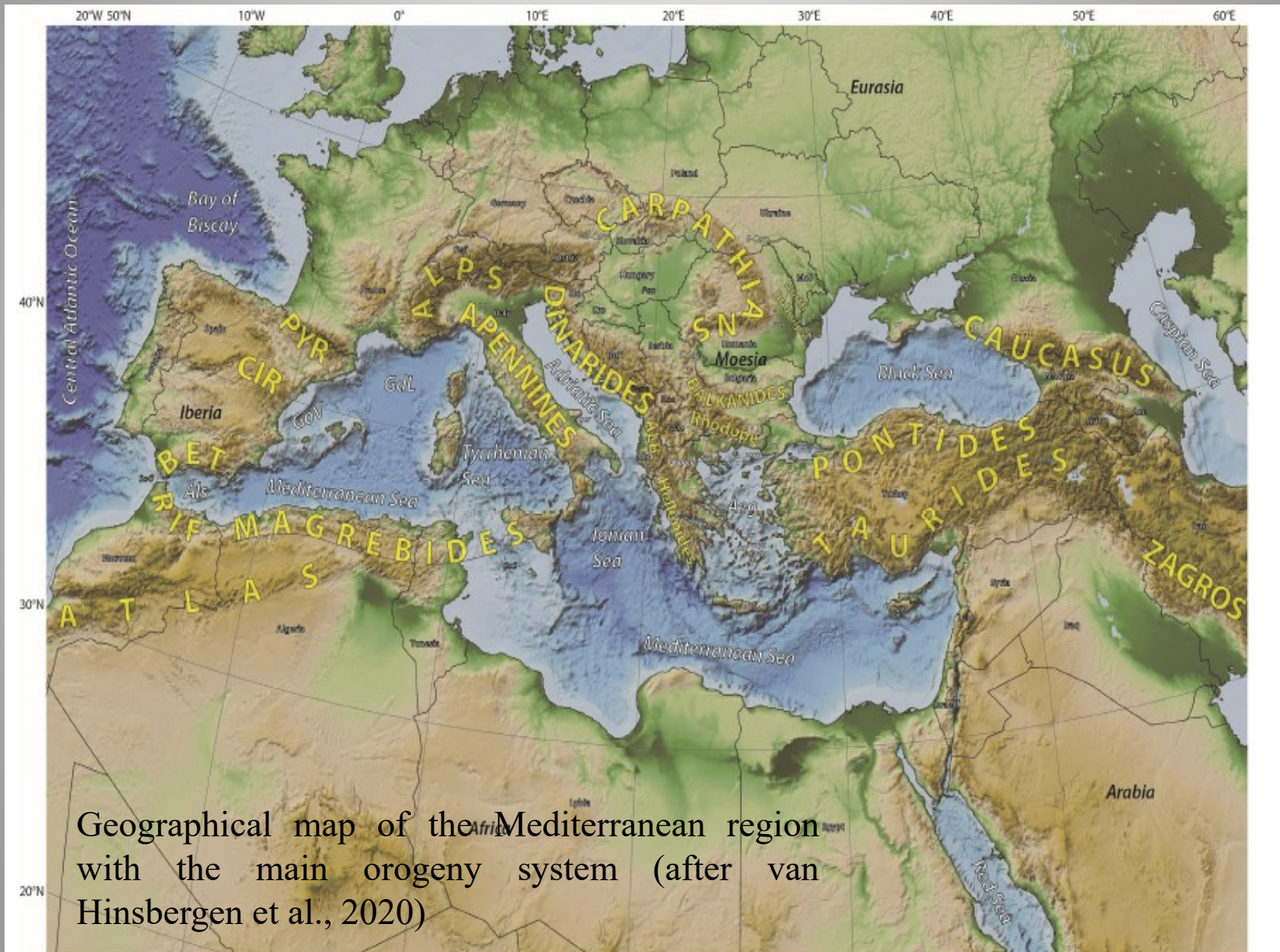
Geological evolution of Bulgaria in the Late Cretaceous



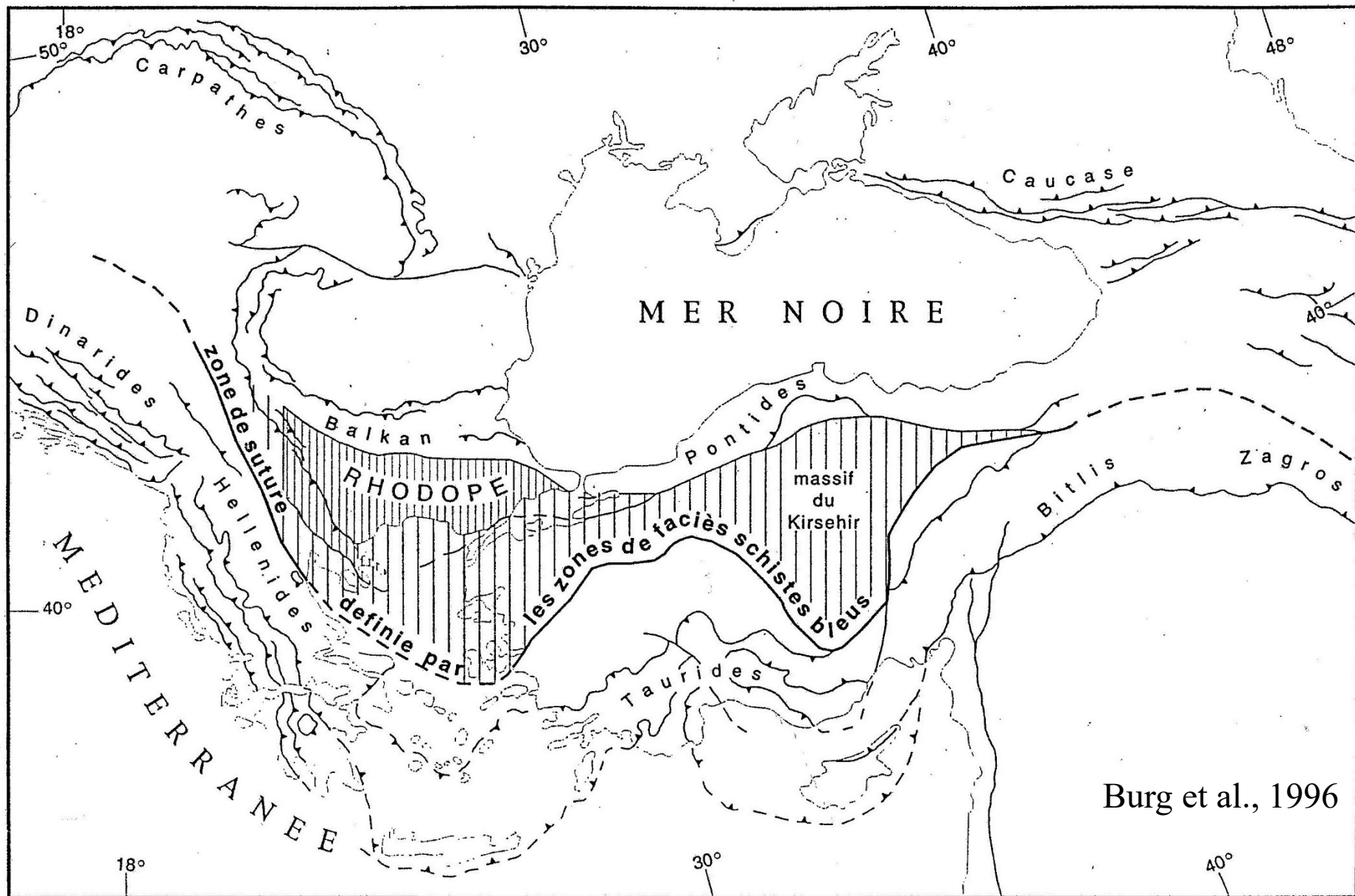
Geological evolution of Bulgaria in the Late Cretaceous



Position of the territory of Bulgaria in the Alpine orogeny



Position of the territory of Bulgaria in the Alpine orogeny



Geological evolution of Bulgaria in the Paleogene

Middle Eocene 50.2 Ma



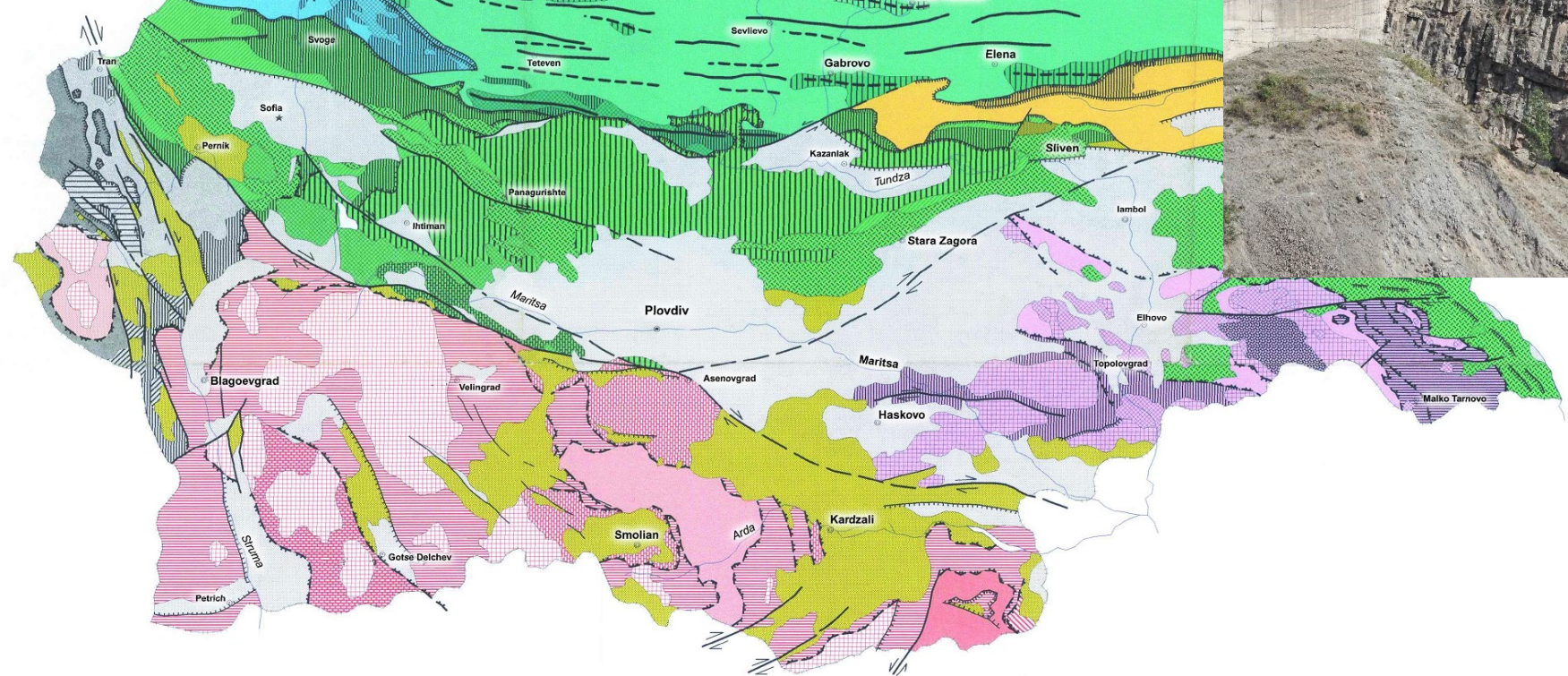
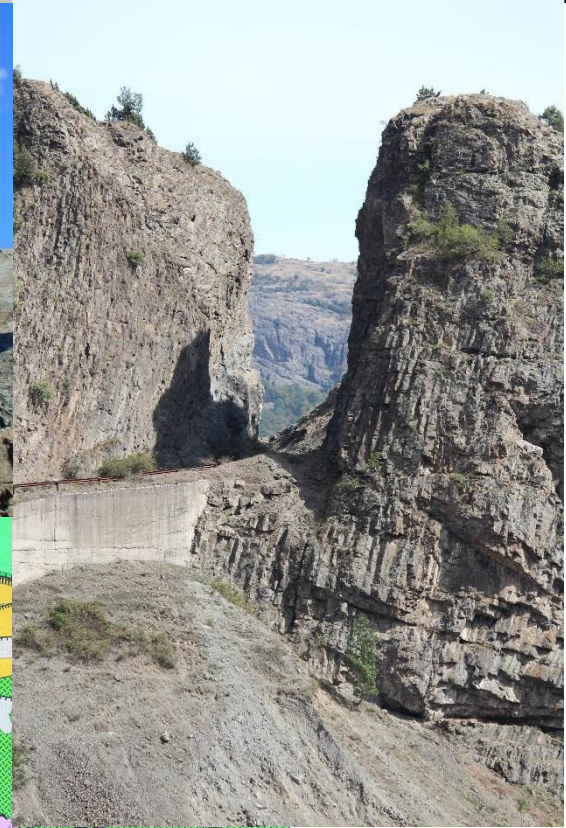
Ancient Landmass

Modern Landmass

Subduction Zone (triangles point in the direction of subduction)

Sea Floor Spreading Ridge

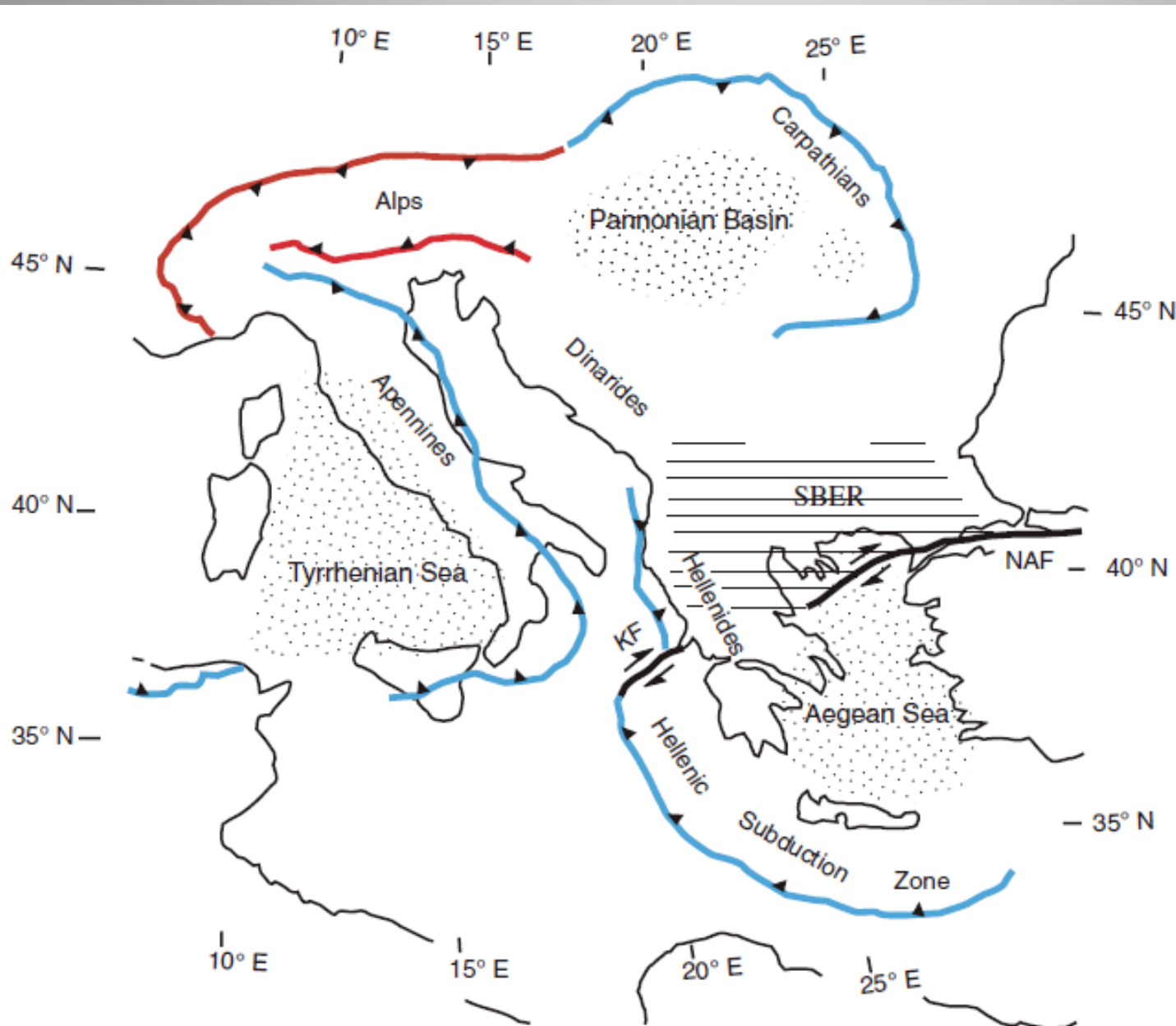
Geological evolution of Bulgaria in the Paleogene



Geological evolution of Bulgaria in the Neogene



Contemporary geodynamics of the territory of Bulgaria

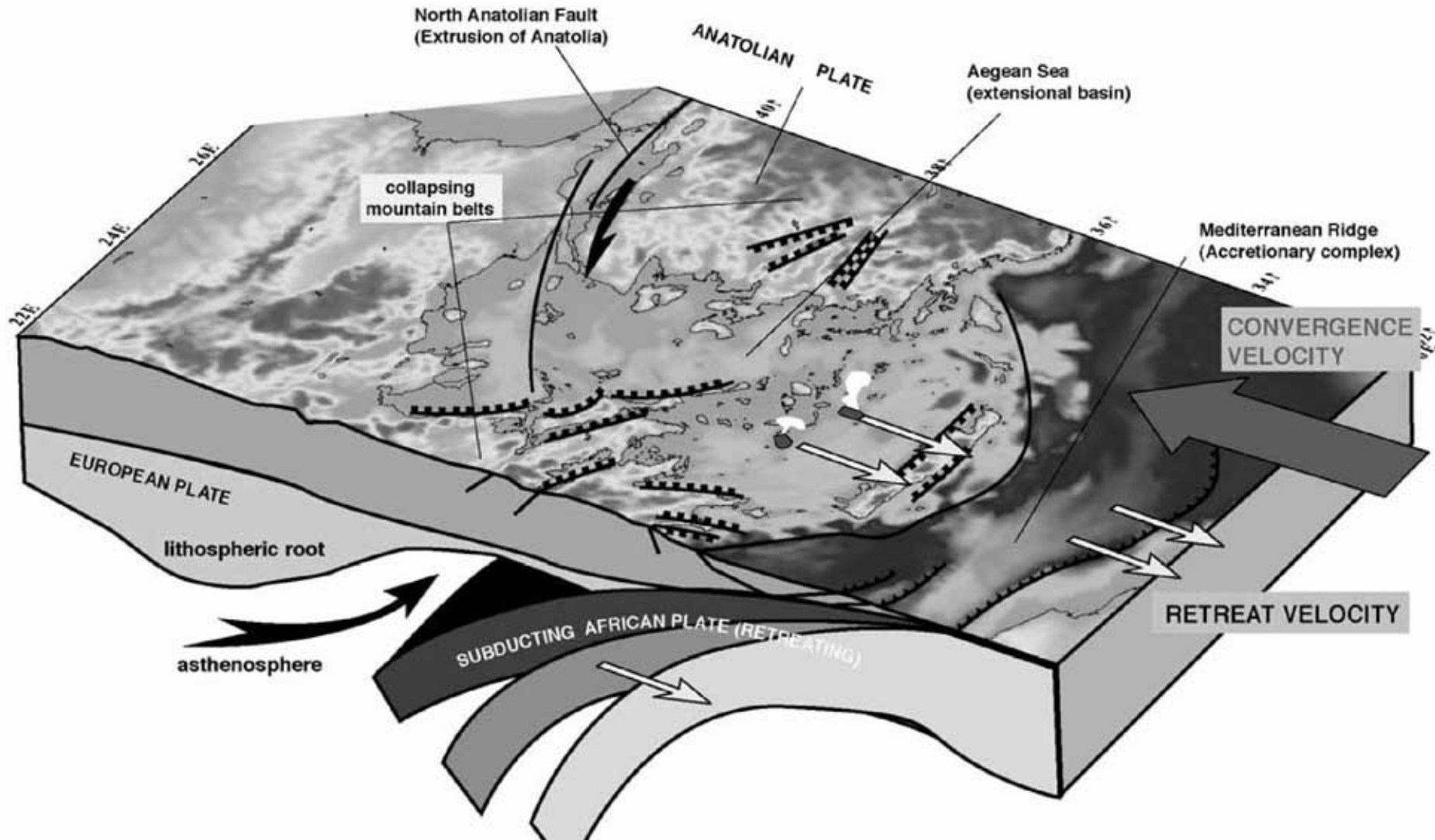


SBER – South
Balkan Extension
Region

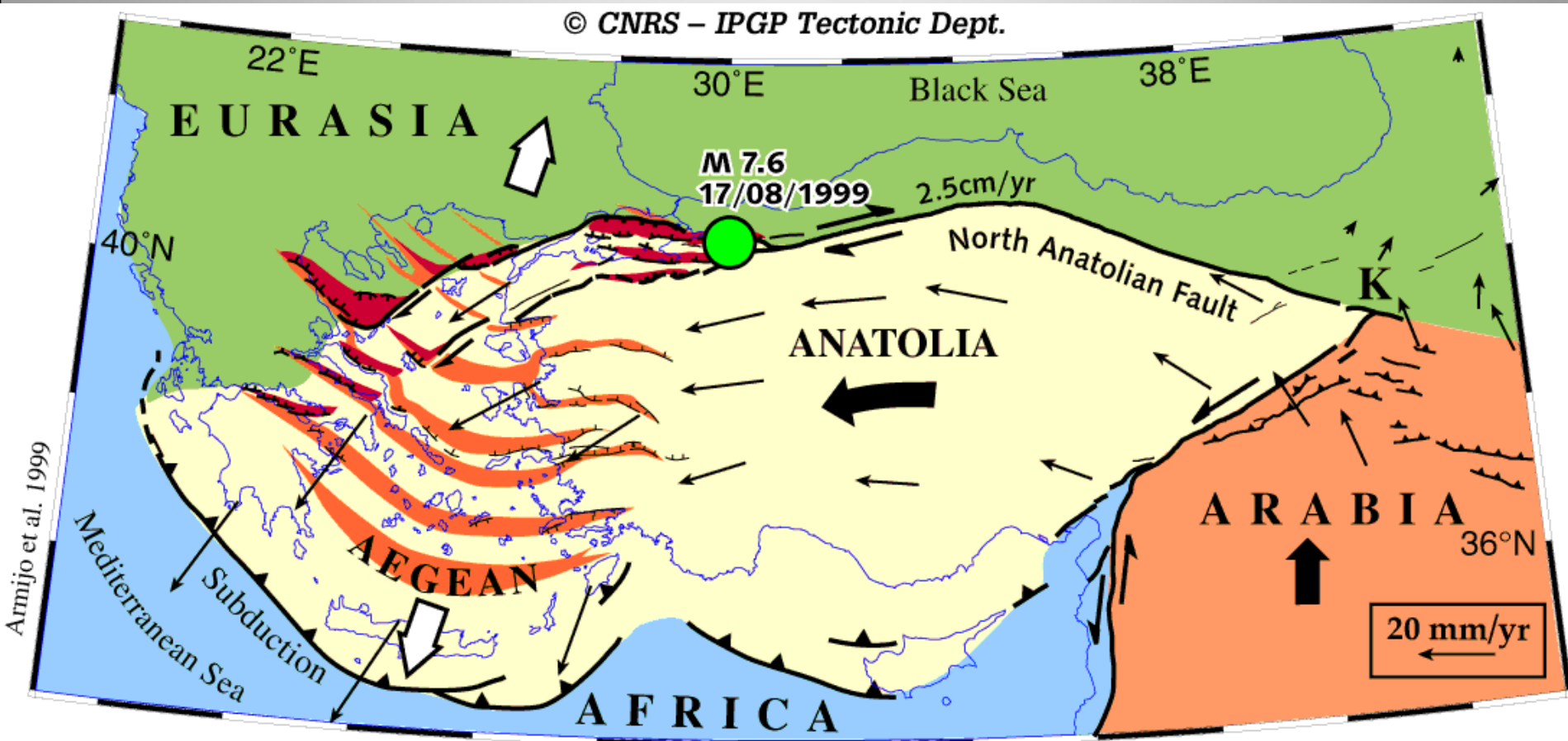
NAF – North
Anadolian Fault

Contemporary geodynamics of the territory of Bulgaria

- Retreating of the African plate to the south
- Regional extension of the territory of Bulgaria

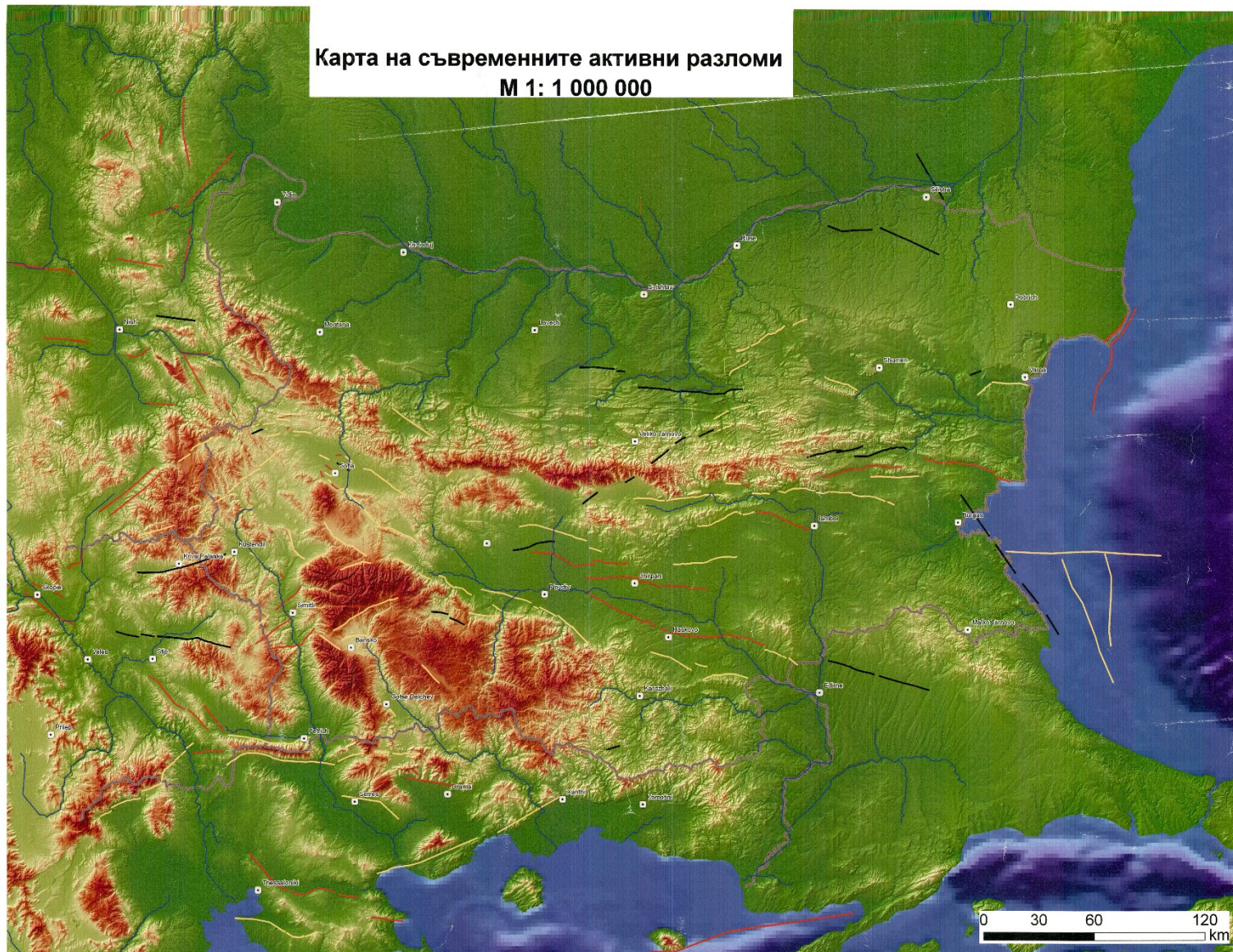


Contemporary geodynamics of the territory of Bulgaria



Contemporary geodynamics of the territory of Bulgaria

Карта на съвременните активни разломи
M 1: 1 000 000



Автори: Ж. Иванов, А. Радулов, Я. Герджиков, Р. Наков

— Активни разломи

— Потенциално активни разломи

— Вероятно активни разломи, недаказана активност

Thank you for your attention!

