

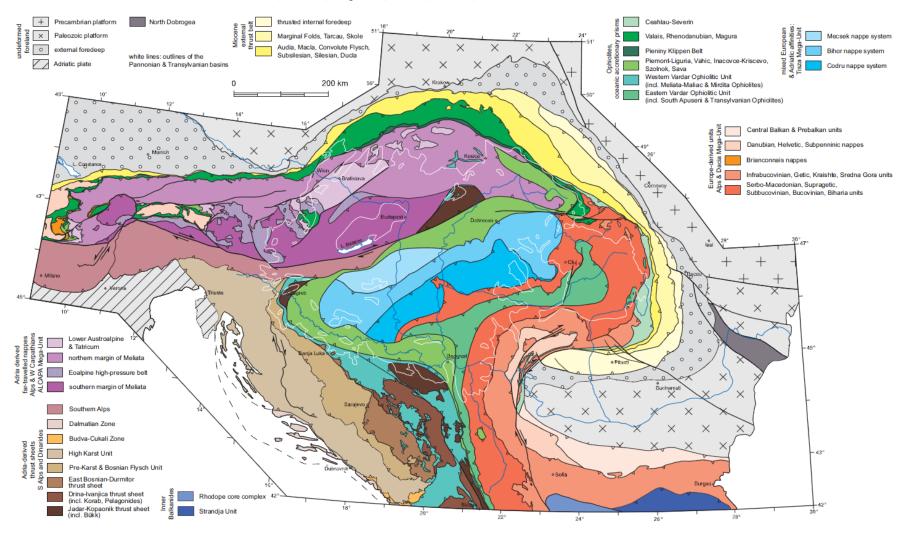
General stratigraphy of the bauxite deposits in the Dinarides

Igor Vlahović

1st REEBAUX Workshop – Ježević, October 14–15, 2019

MAJOR TECTONIC UNITS OF THE ALPS, CARPATHIANS AND DINARIDES

S.M. Schmid, D. Bernoulli, B. Fügenschuh, L. Matenco, S. Schefer, R. Schuster, M. Tischler and K. Ustaszewski

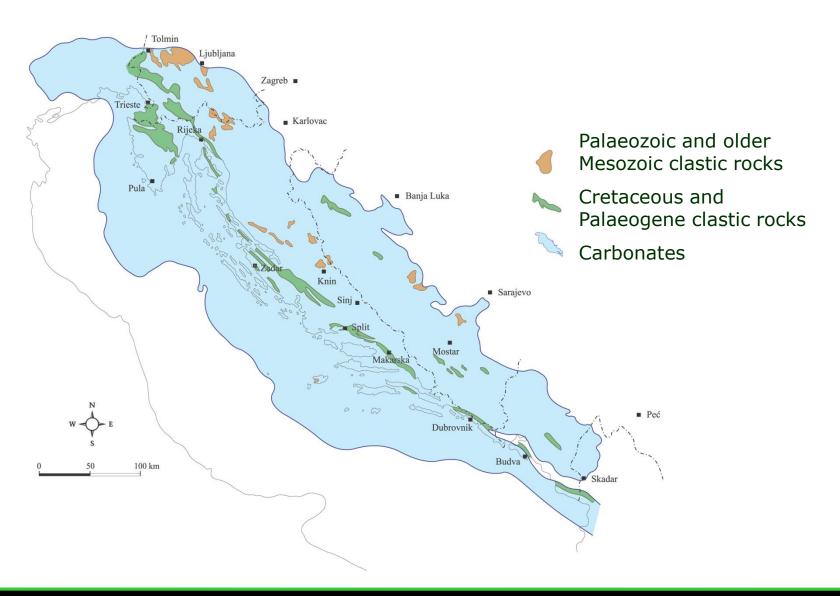


Schmid et al., 2008

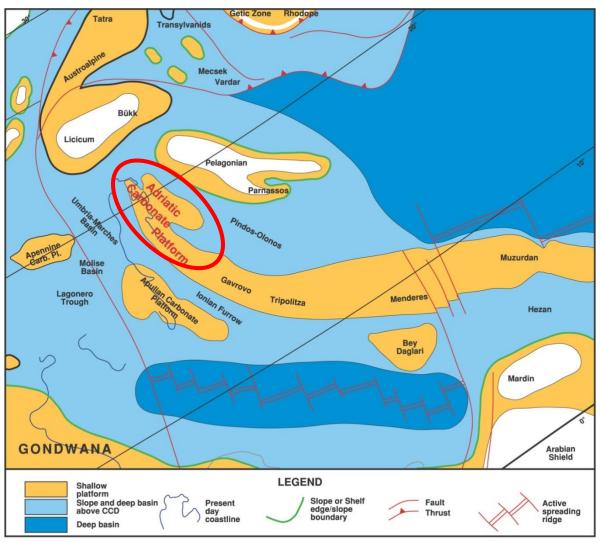








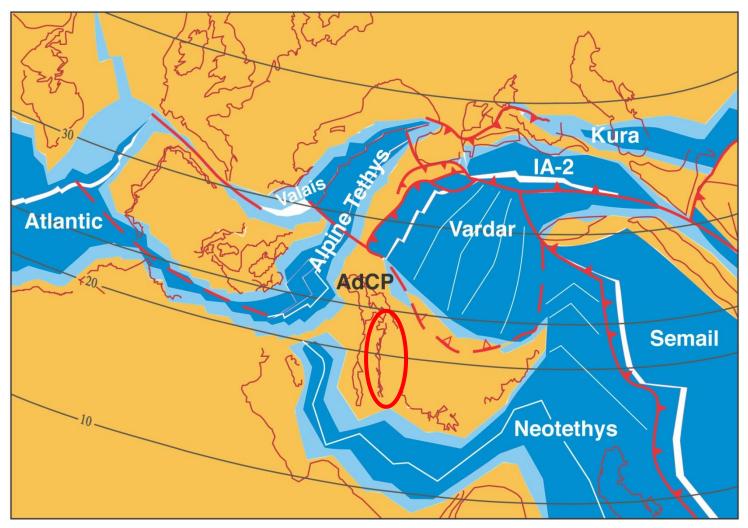
Aptian Paleogeography 1



After Masse et al. (1993) in Dercourt et al. (1993)

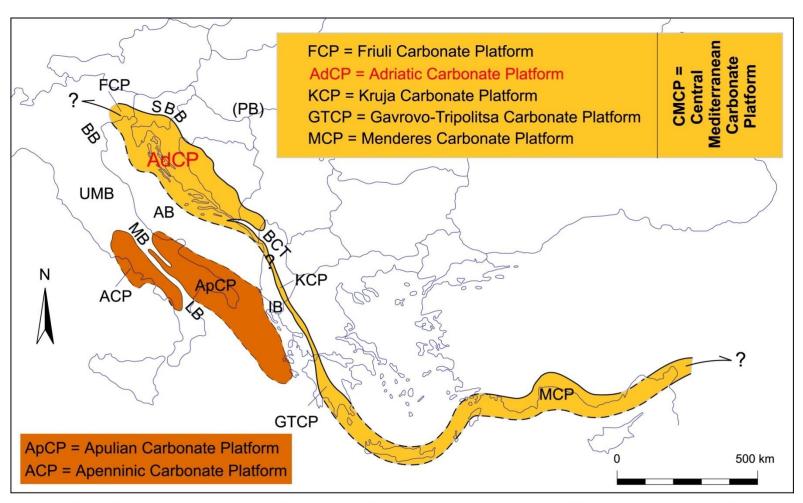


Aptian Paleogeography 2



After Stampfli & Mosar (1999)





AB = Adriatic Basin

BB = Belluno Basin

IB = Ionian Basin

UMB = Umbria-Marche Basin

MB = Molise Basin

LB = Lagonegro Basin

SBB = Slovenian-Bosnian basin

BCT = Budva-Cukali Trough

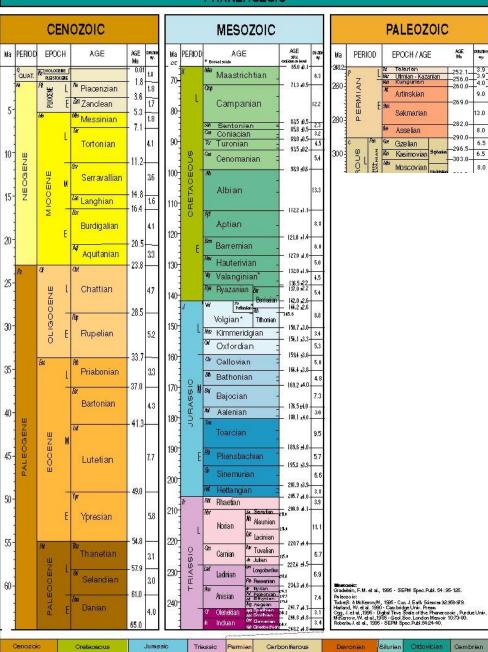
PB = Pannonian Basin

Vlahović et al., 2005





PHANEROZOIC



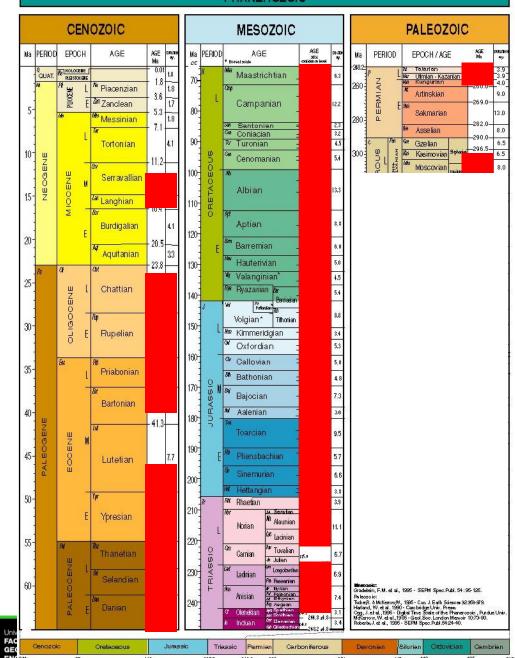
Stratigraphic range of outcrops in the External Dinarides



Univ FAC GEO



PHANEROZOIC



Carbonate deposits (predominantly shallow-marine) in the External Dinarides





D.T.S. Objibil Time Scale, Purdue University) **PHANEROZOIC** CENOZOIC **MESOZOIC PALEOZOIC** Ma PERIOD EPOCH Ma PERIOD EPOCH / AGE AGE Ma PERIOD Maastrichtian Piacenzian Artinskian Campanian Sakmarian Messinian 83.5 £0 85.8 £0 Asselian 89.0 ±0 Turonian Tortonian Cenomanian -303.0-Serravallian ^a Langhian 1122 ±1 Burdigalian 121.0 ±1 Aquitanian 127.0 ₫ Valanginian' 136.5±2 137.0±2 Chattian Volgian* Tithorian Kimmeridgian Rupelian Oxfordian 1594 ±3 av Callovian Bathonian 169.2 ±4 Bartonian 176.5±4. Lutetian AN Rhaetian 227.4 ± Ladinian Mesozoica Gradetein, F.M. et al., 1995 - SEPM Spec.Publ. 54:95-126. oraneous n. m. et al., 1500 ° Sermi open nuti. 1975 ° Ser 1500 ° Ser 1500 ° Sermi open nuti. 1975 ° Ser 1500 ° Anisian Univ FAC GEO

Carboniferous

Overlying Deposits

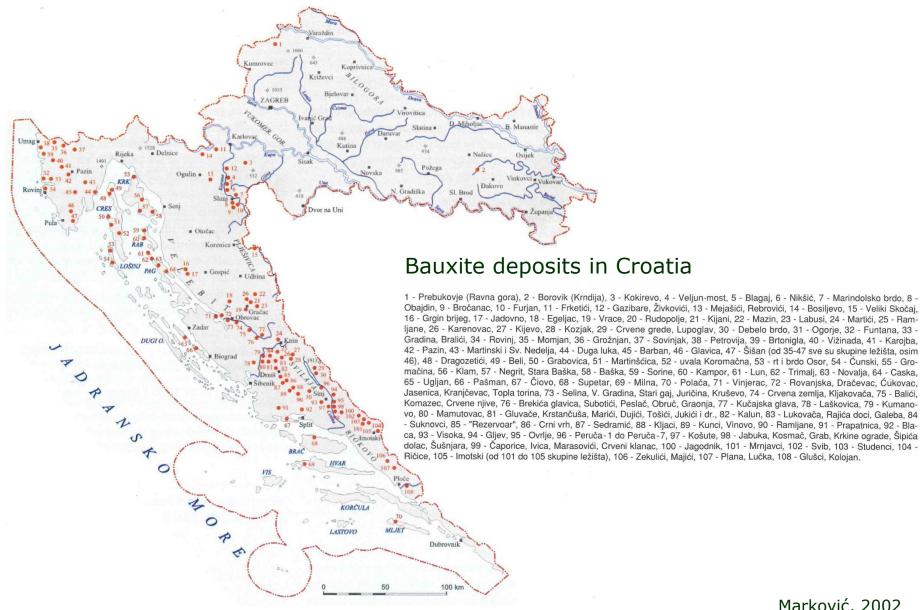
Adriatic Carbonate **Platform**

AdCP basement

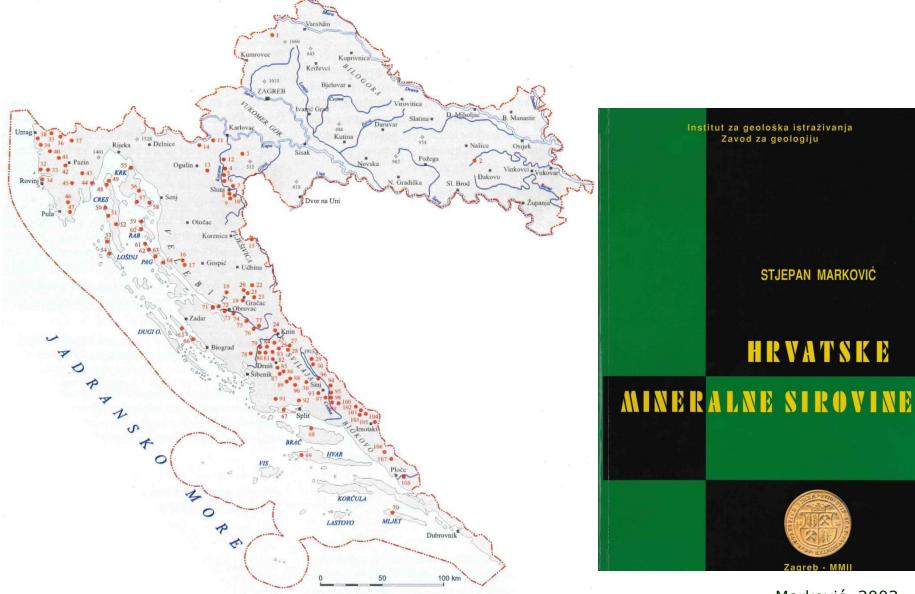


Cenozoic

Cretaceous











| PODINA | KROVINA | ORUDNJENJE | LOKALITET | STAROST | NAPOMENA | |
|---|---|---|--|-------------------------|--|--|
| malm | - | boksitične gline, glinoviti boksiti (?) | Bosanci, Bosiljevo | pleistocen | | |
| baden | plioc pleist. | boksitične gline | Borovik (Krndija) | pliocen - pleistocen | | |
| eocen - oligocen senon cenoman - turon malm apt | sr. miocen | glinoviti boksiti | - Krkine ograde, Grab (dio) (Trilj) - Košute, Čaporice, Ivica, Crveni klanac (sve Trilj) - Peruča - Grab (dio) (Trilj) - Meašići, Rebrovići (Tounj) | neogen | X. horizont | |
| d. i sr. eocen turon - senon | eocen - oligoc. | glinoviti boksiti | - Košute (SZ od Trilja) - Kosmač (JI od Trilja) | ? | krovina: breče neutvrđene starosti | |
| g. eocen - d. oligocen | | | Dujići (SZ od Drniša) | g. eocen, d. oligocen | "intraprominski" bx, pretaloženo | |
| sr. eocen d. i sr. eocen paleocen, d. eocen turon - senon cenoman - turon | d. oligocen g. eocen | boksit | - Suknovci (Oklaj) Obrovac, Ervenik, Promina (u najširem smislu), Moseć, Sinj | g. eocen | krovina: Promina naslage | |
| sr. eocen, g. eocen | | boksit, boksitični vapnenac | Mamutovo brdo (Studenci) | sr. eocen, g. eocen | "intraprominski" bx, pretaloženo | |
| d. i sr. eocen paleocen, d. eocen senon | g. eocen sr. eocen | boksit | Studenci - Imotski | sr. eocen | krovina: Promina naslage | |
| cenoman - turon d. i sr. eocen | sr. eocen | glinoviti boksiti | Kučajska glava (Ervenik) Lukovača (Promina pl.) Promina pl. (tragovi) | sr. eocen | VIII. horizont krovina: Jelar naslage | |
| senon turon - senon cenoman - turon | d. eocen, paleocen | boksit | Istra, Bukovica, Promina - Drniš, Sinj, Studenci - Imotski, Cres, Lošinj, Krk, Rab, Pag i dr. | g. kreda paleogen | VII. horizont krovina: Kozina naslage i foramini- ferski vapnenci | |
| cenoman - turon | senon | boksit | - Gazibare, Živkovići (Krnjak) - Kučevica, Frketići (Z od Duge Rese) | senon | VI. horizont | |
| alb | cenoman - turon | glinoviti boksiti | Debelo brdo (Dinara) Ogorje, Zelovo (Svilaja) | d. kreda g. kreda | | |
| apt barem | alb | tragovi boksitičnih tvorevina, gline | Baderna, Bale i dr. (Istra), otoci | barem | V. horizont | |
| malm | neokom | glinoviti boksiti | Kijevo, Kozjak (Svilaja), Lupoglav (Dinara), Mljet | malm neokom | IV. horizont | |
| kimeridž | titon | glinoviti boksiti, boksitične gline, gline | Funtana, Gradine, Bralići, Kloštar, Rovinj (sve Istra) | malm | III. horizont | |
| anizik | sr. eocen | boksit | Prebukovje (Ravna gora) | ? | | |
| ladinik anizik | lijas | boksitične gline i dr. glinovite stijene boksitične stijene | - Martići (ili Marići - Knin), Sutina (JI Svilaja) - Jabuka (Trilj) | sr. trijas | | |
| anizik | | boksit, glinoviti boksiti, boksitične gline | Kokirevo, Veljun, Obajdin (Slunj) | trijas (?) | | |
| ladinik anizik | karnik | boksit, glinoviti boksiti, boksitične gline | - Bročanac (Slunj), Grgin brijeg, Vrace, (Lika) - Veliki Skočaj (Plješivica) | g. trijas sr. trijas | II. horizont | |
| anizik | ladinik tragovi boksitičnih tvorevina okolica Gračaca lad | | anizik ladinik | I. horizont | | |
| d. trijas | anizik | boksitično-željezovite breče | Sutina (JI Svilaja) | d. trijas anizik | neistraženo, normalno je kontinuitet | |

10 Stratigraphic horizons:

X - L. Jurassic-E, Ol / M_2

IX - L. Cretaceous-Pc- $E_{1,2}$ / $E_{2,3}$ -Ol₁

VIII – L. Cretaceous– $E_{1,2}$ / E_2

VII - L. Cretaceous / Pc, E₁

VI - L. Cretaceous

V - E. Cretaceous

IV - L. Jurassic / E. Cretaceous

III - L. Jurassic

II – M. / L. Triassic

I - M. Triassic

Marković, 2002

| PODINA | KROVINA | ORUDNJENJE | LOKALITET | STAROST | NAPOMENA | |
|---|---|---|--|-------------------------|--|--|
| malm | - | boksitične gline, glinoviti boksiti (?) | Bosanci, Bosiljevo | pleistocen | | |
| baden | plioc pleist. | boksitične gline | Borovik (Krndija) | pliocen - pleistocen | | |
| eocen - oligocen senon cenoman - turon malm apt | sr. miocen | glinoviti boksiti | - Krkine ograde, Grab (dio) (Trilj) - Košute, Čaporice, Ivica, Crveni klanac (sve Trilj) - Peruča - Grab (dio) (Trilj) - Meašići, Rebrovići (Tounj) | neogen | X. horizont | |
| d. i sr. eocen turon - senon | eocen - oligoc. | glinoviti boksiti | - Košute (SZ od Trilja) - Kosmač (JI od Trilja) | ? | krovina: breče neutvrđene starosti | |
| g. eocen - d. oligocen | | | Dujići (SZ od Drniša) | g. eocen, d. oligocen | "intraprominski" bx, pretaloženo | |
| sr. eocen d. i sr. eocen paleocen, d. eocen turon - senon cenoman - turon | d. oligocen g. eocen | boksit | - Suknovci (Oklaj) Obrovac, Ervenik, Promina (u najširem smislu), Moseć, Sinj | g. eocen | krovina: Promina naslage | |
| sr. eocen, g. eocen | | boksit, boksitični vapnenac | Mamutovo brdo (Studenci) | sr. eocen, g. eocen | "intraprominski" bx, pretaloženo | |
| d. i sr. eocen paleocen, d. eocen senon | g. eocen sr. eocen | boksit | Studenci - Imotski | sr. eocen | krovina: Promina naslage | |
| cenoman - turon d. i sr. eocen | sr. eocen | glinoviti boksiti | Kučajska glava (Ervenik) Lukovača (Promina pl.) Promina pl. (tragovi) | sr. eocen | VIII. horizont krovina: Jelar naslage | |
| senon turon - senon cenoman - turon | d. eocen, paleocen | boksit | Istra, Bukovica, Promina - Drniš, Sinj, Studenci - Imotski, Cres, Lošinj, Krk, Rab, Pag i dr. | g. kreda paleogen | VII. horizont krovina: Kozina naslage i foramini- ferski vapnenci | |
| cenoman - turon | senon | boksit | - Gazibare, Živkovići (Krnjak) - Kučevica, Frketići (Z od Duge Rese) | senon | VI. horizont | |
| alb | cenoman - turon | glinoviti boksiti | Debelo brdo (Dinara) Ogorje, Zelovo (Svilaja) | d. kreda g. kreda | | |
| apt barem | alb | tragovi boksitičnih tvorevina, gline | Baderna, Bale i dr. (Istra), otoci | barem | V. horizont | |
| malm | neokom | glinoviti boksiti | Kijevo, Kozjak (Svilaja), Lupoglav (Dinara), Mljet | malm neokom | IV. horizont | |
| kimeridž | titon | glinoviti boksiti, boksitične gline, gline | Funtana, Gradine, Bralići, Kloštar, Rovinj (sve Istra) | malm | III. horizont | |
| anizik | sr. eocen | boksit | Prebukovje (Ravna gora) | ? | | |
| ladinik anizik | lijas | boksitične gline i dr. glinovite stijene boksitične stijene | - Martići (ili Marići - Knin), Sutina (JI Svilaja) - Jabuka (Trilj) | sr. trijas | | |
| anizik | | boksit, glinoviti boksiti, boksitične gline | Kokirevo, Veljun, Obajdin (Slunj) | trijas (?) | | |
| ladinik anizik | karnik | boksit, glinoviti boksiti, boksitične gline | - Bročanac (Slunj), Grgin brijeg, Vrace, (Lika) - Veliki Skočaj (Plješivica) | g. trijas sr. trijas | II. horizont | |
| anizik | ladinik tragovi boksitičnih tvorevina okolica Gračaca lad | | anizik ladinik | I. horizont | | |
| d. trijas | anizik | boksitično-željezovite breče | Sutina (JI Svilaja) | d. trijas anizik | neistraženo, normalno je kontinuitet | |

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VIII – L. Cretaceous– $E_{1,2}$ / E_2

VII - L. Cretaceous / Pc, E₁

VI - L. Cretaceous

V - E. Cretaceous

IV – L. Jurassic / E. Cretaceous

III - L. Jurassic

II – M. / L. Triassic

I - M. Triassic

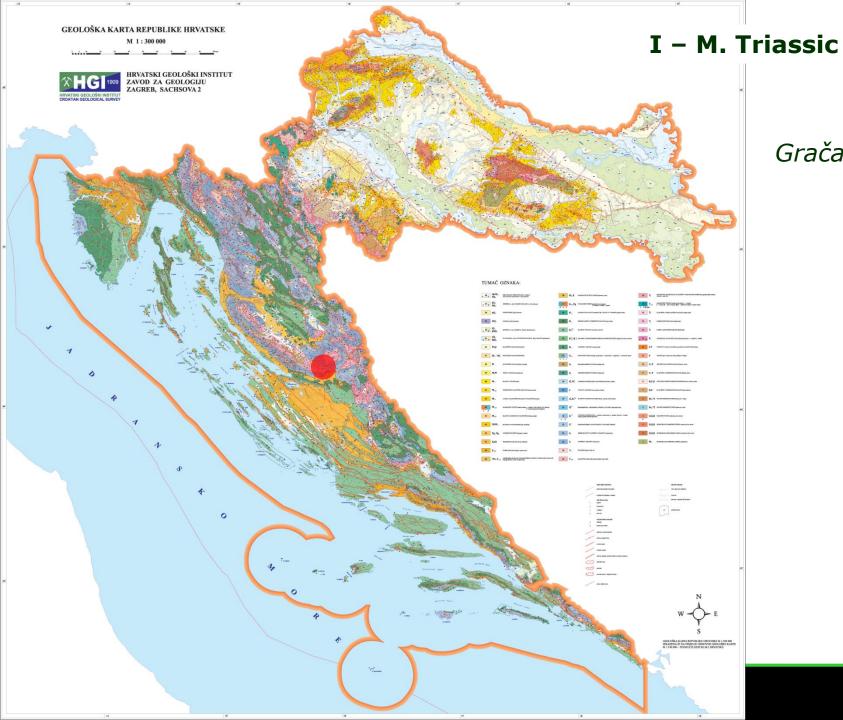
Marković, 2002

| | Erath Chi | System Era | Series / Epoch | | | Eone. | 3/46 | System/Era | 000 | ò | | |
|-------------|-----------|------------|----------------|---|---------------------------------------|-------------|---------------|------------|---------------|--------------|--------------|-----|
| £0, | Erath | System | Series / Epoch | Stage / Age | numerical age (Ma) | FOND | Erath Charles | Syst | Se | ries / Epoch | Stag | |
| | | ary | Holocene ML/E | Meghalayan Northgrippian Greenlandian | present 0.0042 0.0082 0.0117 | | | | | | Tith | |
| | | Quaternary | | Upper Middle | 0.0117 | | | | | Upper | Kimme | |
| | | ate | Pleistocene | 0.11: | 0.781 | | | | | | Oxfo | |
| | | Qu | | Gelasian 🔇 | 1100 | | | ပ | | | Call | |
| | | | Pliocene | Piacenzian < | 2.58 3.600 | | | SS | | Middle | Bath Bajo | |
| | | | 1 HOCCHO | Zanclean < | 5.333 | | | Jurassic | | | Aale | |
| | | ЭС | | Messinian < | 7.246 | | | ے | | | Toa | |
| | | Neogene | | Tortonian < | 11.63 | | <u>0</u> | | | | Pliens | |
| | | 60 | Miocene | Serravallian < | 13.82 | | Mesozoic | | | Lower | | |
| | Cenozoic | Z | | Langhian | 15.97 | | SSC | | | | Sine | |
| | OZ | | | Burdigalian | 20.44 | | ž | | | | Hetta | |
| | Sen | | | Aquitanian < | 23.03 | | | | | | Rha | |
| | O | | Oligonopo | Chattian < | 27.82 | | | | | Upper | No | |
| | | | Oligocene | Rupelian | 33.9 | | | sic | | Opper | INC | |
| | | Φ | | Priabonian | | | | Triassic | | | Ca | |
| | | en | | Bartonian | 37.8 41.2 | | | Ē | | | Lac | |
| oio | | og | Eocene | Lutetian | | ojo | | | | Middle | An | |
| Phanerozoic | | Paleogene | | Ynresian | 47.0 | Phanerozoic | | | | Lower | Oler | |
| ne | | Δ. | | | 56.0 | ne | | | | | Inc Chang | |
| ha | | | Paleocene | Thanetian < | .00.12 | ha | | | L | opingian | Wuchia | |
| ш | | | | Danies | 01.0 | ш | | | | | Capi | |
| | | | | | 66.0 | | | _ | Gu | adalupian | Wo | |
| | | | | Maastrichtian < | 72.1 ±0.2 | | | nia | | | Roa | |
| | | | | Campanian | | | | Permian | | | Kung | |
| | | | Upper | Santonian < | 83.6 ±0.2 | | | Ф | | | Artir | |
| | | | Оррсі | Coniacian | 00.3 ±0.5 | | O | | C | isuralian | | |
| | | S | | Turonian | 89.8 ±0.3 | | Paleozoic | | | | Sakr | |
| | Si. | no | | Conomonian | 93.9 | | e0, | | - LE | | Gzł | |
| | esozoic | Ce | | Ceriornaman | 100.5 | | Pal | | ania | Upper | Kasir | |
| | les | Cretaceous | | Albian | 7.72.2 | | - | | Pennsylvanian | Middle | Mos | |
| | Σ | Ö | | Antina | ~ 113.0 | | | 2 | enn | Lower | Bash | |
| | | | | Aptian | ~ 125.0 | | | Jife | | | | |
| | | | Lower | Barremian | ~ 129.4 | | | bor | oian | Upper | Serpu | |
| | | | Lower | Hauterivian | ~ 132.9 | | | dr. | Carboniferou | sipp | Middle | Vis |
| | | | | Valanginian | ~ 139.8 | | | Ö | Mississippian | | | |
| | | | | Berriasian | | | | | Z | Lower | Tourr | |
| | | | | | ~ 145.0 | | | | | | | |

| | 3/4 | 10 LE 14 | 000 | \$ | | |
|-------------|------------|-------------|---------------|--------------|-------------------------|--------------------------------|
| Fono | Erath, | System Era | Se | ries / Epoch | Stage / Age | numerical ge (Ma) |
| | | | | | Tithonian | ~ 145.0 |
| | | | | Upper | Kimmeridgian | 152.1 ±0.9 |
| | | | | | Oxfordian | 157.3 ±1.0 |
| | | ပ | | | Callovian | 163.5 ±1.0 166.1 ±1.2 |
| | | SS | | Middle | Bathonian Bajocian | 168.3 ±1.3 170.3 ±1.4 |
| | | urassic | | | | 170.3 ±1.4 174.1 ±1.0 |
| | | 7 | | | Toarcian | 4 |
| | Mesozoic | | | Lower | Dionahashian | 182.7 ±0.7 190.8 ±1.0 |
| | SOZ | | | | Sinemurian | 190.0 11.0 |
| | Jes | | | | Hettangian | 199.3 ±0.3 201.3 ±0.2 |
| | _ | | | | Rhaetian | ACCUSAGE CONTRACTOR |
| | | | | Upper | Norian | ~ 208.5 |
| 0 | | sic | | Оррог | rtonan | ~ 227 |
| | | riassic | | | Carnian | 4 |
| | | F | | | Ladinian | ~ 237 |
| Phanerozoic | | | | Middle | Anisian | 247.0 |
| roz | | | | Lower | Olenekian | 247.2 251.2 |
| ne | | | | | Induan Changhsingian | 251.902 ±0.024 254.14 ±0.07 |
| ha | | | L | opingian | Wuchiapingian | 204.14 20.07 |
| П | | | | | Capitanian | 259.1 ±0.5 |
| | | _ | Gu | adalupian | Wordian | 265.1 ±0.4 268.8 ±0.5 |
| | | nia | | | Roadian | 272.95 ±0.11 |
| | | Permian | | | Kungurian | 283.5 ±0.6 |
| | | _ | С | isuralian | Artinskian | 290.1 ±0.26 |
| | Sic | | | | Sakmarian | 293.52 ±0.17 |
| | OZC | | | | Asselian | 298.9 ±0.15 |
| | Paleozoic | | ian | Upper | Gzhelian | 303.7 ±0.1 |
| | P | | Ivar | | Kasimovian | 307.0 ±0.1 |
| | | Sno | nsylv | Middle | Moscovian | 315.2 ±0.2 |
| | | iferc | Pen | Lower | Bashkirian , | 323.2 ±0.4 |
| | | O | an | Upper | Serpukhovian | 330.9 ±0.2 |
| | | Carbonifero | Mississippian | Middle | Visean | |
| | | | Missi | Lower | Tournaisian | 346.7 ±0.4 358.9 ±0.4 |
| | | | | | | - 000.0 IU.4 |

I - M. Triassic

Anisian / Ladinian

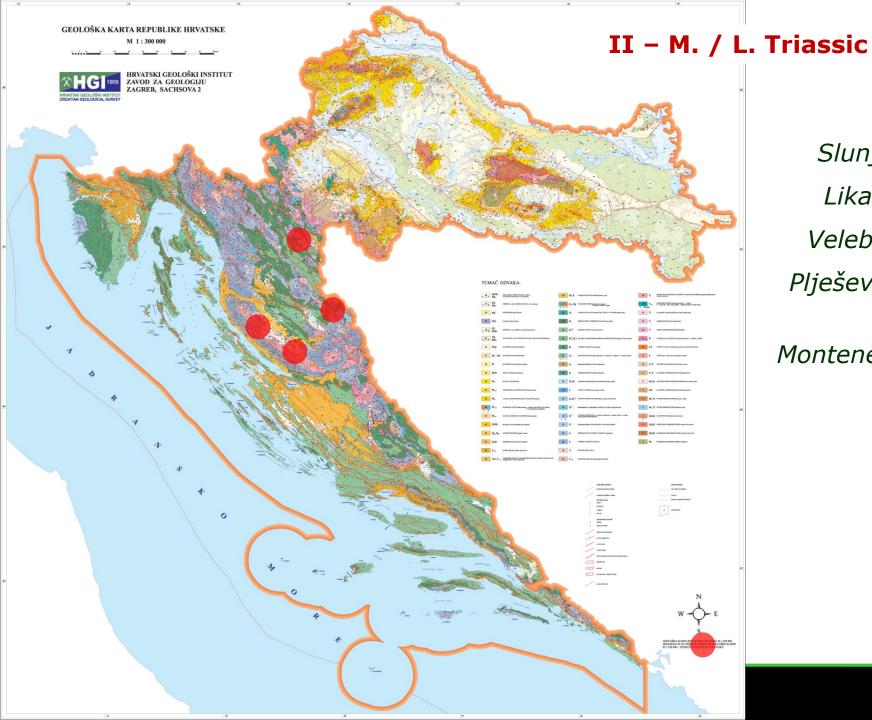


Gračac Area

| | mIE | 1/4500 | Series / Epoch | | | | Eran, mothom | 1/E/3 | Ser Ser | 8 | | |
|-------------|------------|------------|-------------------|---|--|-------------|--------------|---------------|---|--------------|----------------------------|--------------------------------|
| Fonou | Erath, E. | | Series / Epoch | Stage / Age | numerical age (Ma) present 0.0042 | \$COND. | 40, 14 A | System Fra | Ser | ries / Epoch | Stage / Age | numerical age (Ma) |
| | | Quaternary | Holocene M L/E | Meghalayan Northgrippian Greenlandian | 0.0042 0.0082 0.0117 | | | | | | Tithonian | 152.1 ±0.9 |
| | | ern | | Upper Middle | 0.126 | | | | | Upper | Kimmeridgian | 157.3 ±1.0 |
| | | late | Pleistocene | Calabrian < | 0.781 | | | | | | Oxfordian | 163.5 ±1.0 |
| | | ğ | | Gelasian < | 1.80 2.58 | | | <u>0</u> | | | Callovian Bathonian | 166 1 +1 2 |
| | | | Pliocene | Piacenzian < | 3.600 | | | SSI | - 1 | Middle | Bathonian Sajocian | 168.3 ±1.3 170.3 ±1.4 |
| | | | 1 11000110 | Zanclean < | 5.333 | | | Jurassic | | | Aalenian 4 | 174.1 ±1.0 |
| | | ne | | Messinian < | 7.246 | | ٦ | | | Toarcian | 100 7 10 7 | |
| | | gel | | Tortonian < | 11.63 | | Ö. | | | | Pliensbachian _s | 182.7 ±0.7 |
| | | Neogene | Miocene | Serravallian < | 13.82 | | Mesozoic | | | Lower | | 190.8 ±1.0 |
| | Ö | Z | | Langhian | 15.97 | | esc | | | | Sinemurian | 199.3 ±0.3 |
| | ZOL | | | Burdigalian | 20.44 | | Σ | | | | Hettangian S | 201.3 ±0.2 |
| | Cenozoic | | | Aquitanian < | 23.03 | | | | | | Rhaetian | ~ 208.5 |
| | | | Oligocene | Chattian < | 27.82 | | | | | Upper | Norian | |
| | | | Oligodonio | Rupelian | 33.9 | | | Triassic | | | | |
| | | Φ | | Priabonian | | | | ias | | | Carnian | 3 |
| () | | len | | Bartonian | 37.8 41.2 | () | | Ë | | | Ladinian | |
| Phanerozoic | | Paleogene | Eocene | Lutetian | 47.0 | Phanerozoic | | | | Middle | Anisian | 242 |
| roz | | ale | | Ypresian | 47.8 | roz | | | | Lower | Olenekian | 247.2 251.2 |
| ıne | | ш | | Thanetian | 56.0 | ine | | | 100000000000000000000000000000000000000 | | Induan Changhsingian | 251.902 ±0.024 |
| he | | | Paleocene | Selandian s | 59.2 | | | | Lopingian | | Wuchiapingian s | 259.1 ±0.5 |
| ш | | | | Danian s | 61.6 | ш | | | | | Capitanian 💪 | |
| | | | | 7 | 66.0 | | | _ | Gua | adalupian | Wordian < | |
| | | | | Maastrichtian < | 72.1 ±0.2 | | | nia | | | Roadian | 100 (200 to 1000) 10 (00 1000) |
| | | | | Campanian | | | | Permian | | | Kungurian | |
| | | | Upper | Santonian < | 83.6 ±0.2 86.3 ±0.5 | | | П | | | Artinskian | 283.5 ±0.6 |
| | | | Оррсі | Coniacian | | | () | | Ci | isuralian | | 290.1 ±0.26 |
| | | " | | Turonian | 89.8 ±0.3 | | Paleozoic | | | | Sakmarian 4 | 200.02 10.17 |
| | <u>S</u> . | Cretaceous | | Conomonion | 93.9 | | 90Z | | <u>_</u> | | Asselian S | 298.9 ±0.15 |
| | Mesozoic | ce | | Cenomanian < | 100.5 | | ale | | Pennsylvanian | Upper | Kasimovian | 303.7 ±0.1 307.0 ±0.1 |
| | es | eta | | Albian | | | ш | | sylva | Middle | Moscovian | |
| | Σ | Ö | | 1 | ~ 113.0 | | | no. | Suus | | D. H. L. | 315.2 ±0.2 |
| | | | | Aptian | 105.0 | | | ifer | P | Lower | Bashkirian _s | 323.2 ±0.4 |
| | | | | Barremian | ~ 125.0 | | | Carboniferous | | | Serpukhovian | 330.9 ±0.2 |
| | | | Lower | Hauterivian | ~ 129.4 | | | arb | iddi | Middle | Viscon | 555.5 10.2 |
| | | | | Valanginian | ~ 132.9 | | | Cal | siss | Middle | Visean | 346.7 ±0.4 |
| | | | | | ~ 139.8 | | | | Mississippian | Lower | Tournaisian | 340.7 10.4 |
| | | | | Berriasian | ~ 145.0 | | | | 10 m | LOWE | Tournaisian | 358.9 ±0.4 |

II - M. / L. Triassic

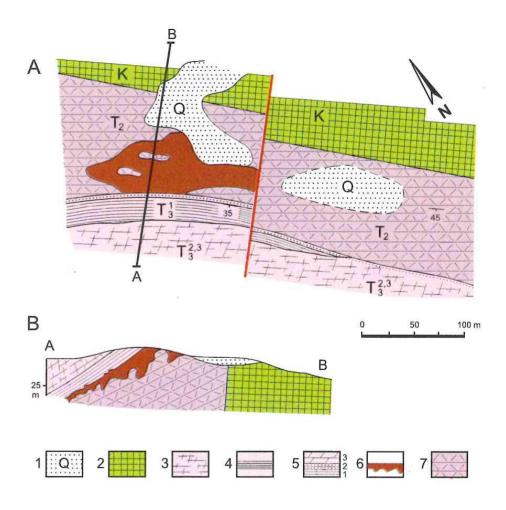
Anisian-Ladinian / Norian



Slunj Lika Velebit Plješevica

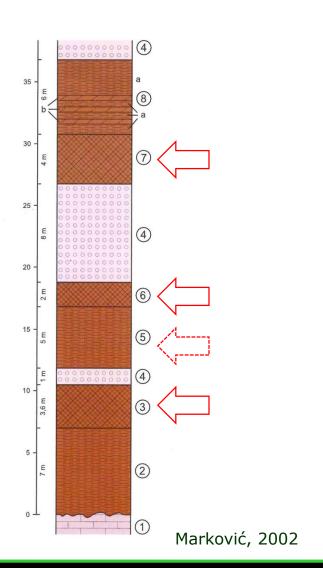
Montenegro

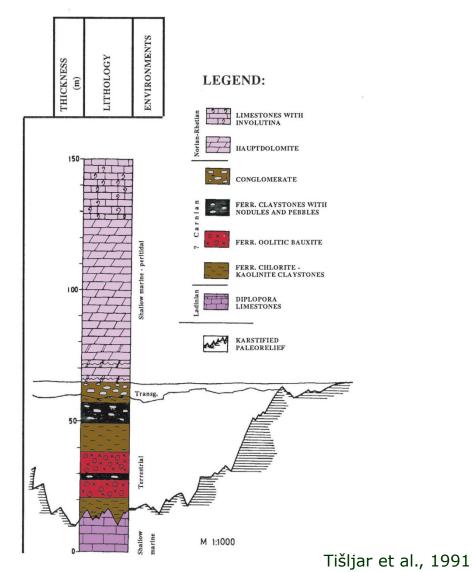
Bročanac deposit near Slunj



Marković, 2002

Vrace deposit near Gračac





| , | Erath F | System Era | Series / Epoch | | Ġ. | | į | Eran Eran | System Era | M/ Porio | 0 | | Ġ. | |
|-------------|----------|------------|----------------|---|---------------|---------------------------------------|-------------|-----------|---------------|---------------|--------------|------------------------|----------------------|--|
| Fon | Trail I | 18/8 | Series / Epoch | Stage / Age | A GSSP | numerical age (Ma) | Egn. | Frai | 18/8 | Se | ries / Epoch | Stage / Age | GSSP | |
| | | ary | Holocene M L/E | Meghalayan Northgrippian Greenlandian | 3 | present 0.0042 0.0082 0.0117 | | | | | | Tithonian | | |
| | | Quaternary | | Upper Middle | | 0.126 | | | | | Upper | Kimmeridgian | 1 | |
| | | late | Pleistocene | Calabrian | 1 | 0.781 | | | | | | Oxfordian | | |
| | | ğ | | Gelasian | 1 | 1.80 2.58 | | | 0 | | | Callovian Bathonian | ~ | |
| | | | Pliocene | Piacenzian | 3 | 3.600 | | | Jurassic | | Middle | Bajocian | 3 | |
| | | | rilocerie | Zanclean | 1 | 5.333 | | | La | | | Aalenian | 1 | |
| | | e | | Messinian | 1 | 7.246 | | | 5 | | | Toarcian | < | |
| | | Neogene | | Tortonian | 1 | 11.63 | | O | | | | Pliensbachian | | |
| | |) Oe | Miocene | Serravallian | 1 | 13.82 | | Mesozoic | | | Lower | i licrispaciliari | 1 | |
| | Sic | ž | Milocerie | Langhian | | 15.97 | | SO | | | | Sinemurian | 4 | |
| | Cenozoic | | | Burdigalian | | 20.44 | | Me | | | | Hettangian | 1 | |
| | ence | | | Aquitanian | 3 | 23.03 | | | | | | Rhaetian | | |
| | Ö | | | Chattian | 3 | 27.82 | | | | | | | | |
| | | | Oligocene | Rupelian | 1 | 21.02 | | | O | | Upper | Norian | | |
| | | (1) | | Priabonian | 1 | 33.9 | | | Triassic | | | Carnian | | |
| | | Paleogene | | Bartonian | | 37.8 | | | Ë | | | | 3 | |
| oic | | obc | Eocene | Lutetian | | 41.2 | Sic | | | | Middle | Ladinian | 1 | |
| Phanerozoic | | ale (| | | | 1 | 47.8 | OZC | | | | * | Anisian Olenekian | |
| er | | Б | | Ypresian | 56.0 9 | | erc | | | Lower | | Induan | 3 | |
| ıan | | | Paleocene | Thanetian | 1 | 59.2 | Phanerozoic | | | L | opingian | Changhsingian | 3 | |
| P | | | | Selandian | 1 | 61.6 | 급 | | | | | Wuchiapingian | 150 | |
| | | | | Danian | 1 | 66.0 | | | | | | Capitanian | 3 | |
| | | | | Maastrichtian | 1 | 00.0 | | | an | Gu | adalupian | Wordian | 4 | |
| | | | | | | 72.1 ±0.2 | | | ï. | | | Roadian | 3 | |
| | | | | Campanian | | 83.6 ±0.2 | | | Permian | | | Kungurian | | |
| | | | Upper | Santonian | 1 | 86.3 ±0.5 | | | | _ | isuralian | Artinskian | | |
| | | | | Coniacian | | 89.8 ±0.3 | | ပ | | ٥ | isuraliari | Sakmarian | | |
| | | S | | Turonian | < | | | Paleozoic | | | | Asselian | 3 | |
| | S. | oni | | Cenomanian | | 93.9 | | 60 | | = | | Gzhelian | | |
| | ÖZ | Se | | Ceriornaman | 1 | 100.5 | | al | | anie | Upper | Kasimovian | | |
| | Mesozoic | Cretaceous | | Albian | < | ~ 113.0 | | _ | Sn | vlksu | Middle | Moscovian | | |
| | _ | O | | Aptian | | | | | Carboniferous | Pennsylvanian | Lower | Bashkirian | 4 | |
| | | | | Barremian | | ~ 125.0 | | | onii | an | Upper | Serpukhovian | | |
| | | | Lower | Hauterivian | | ~ 129.4 | | | arb | Mississippian | Middle | \ <i>(</i> : | | |
| | | | | Valanginian | | ~ 132.9 | | | ပိ | issi | Middle | Visean | 3 | |
| | | | | | | ~ 139.8 | | | | Aiss | Lower | Tournaiais | | |
| | | | | Berriasian | | ~ 145.0 | | | | 2 | Lower | Tournaisian | 4 | |

III - L. Jurassic

numerical

age (Ma) ~ 145.0

163.5 ±1.0 166.1 ±1.2 168.3 ±1.3

170.3 ±1.4

174.1 ±1.0

182.7 ±0.7

190.8 ±1.0 199.3 ±0.3 201.3 ±0.2

~ 208.5

~ 227

~ 237 ~ 242

247.2 251.2

251.902 ±0.024

254.14 ±0.07

259.1 ±0.5

265.1 ±0.4

268.8 ±0.5

272.95 ±0.11

283.5 ±0.6

290.1 ±0.26

293.52 ±0.17

298.9 ±0.15

303.7 ±0.1

307.0 ±0.1

315.2 ±0.2

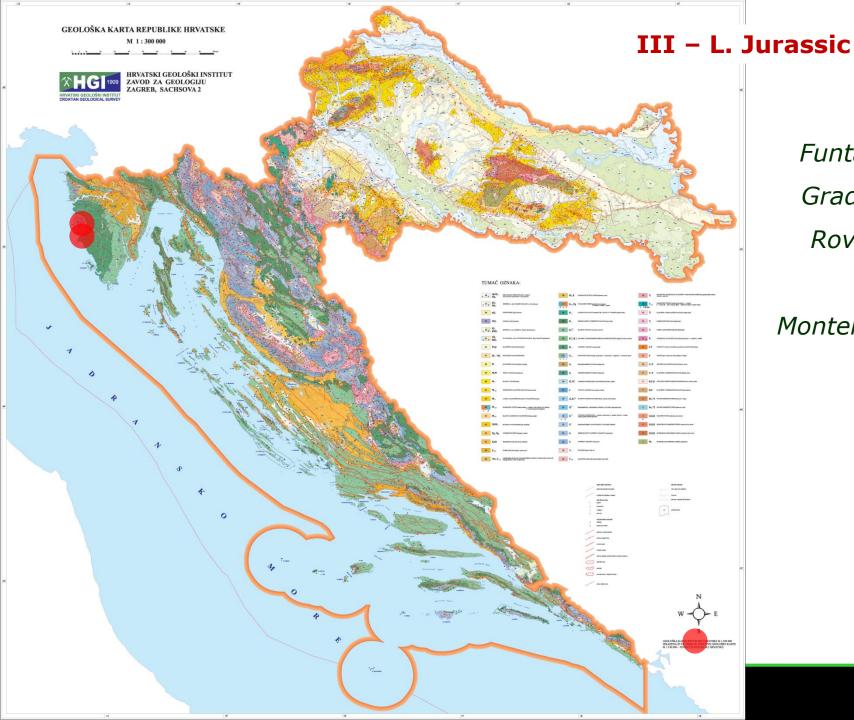
323.2 ±0.4

330.9 ±0.2

346.7 ±0.4

358.9 ±0.4

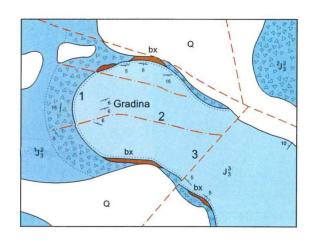
E. Kimmeridgian / L. Tithonian



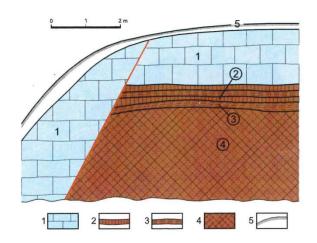
Funtana Gradine Rovinj

Montenegro

Gradina deposit near Vrsar



Rovinj I deposit



Marković, 2002

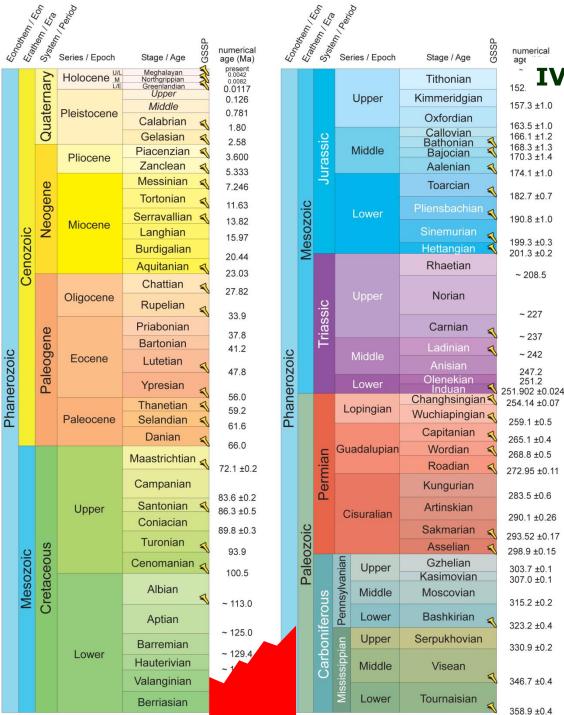
Rovinj I deposit





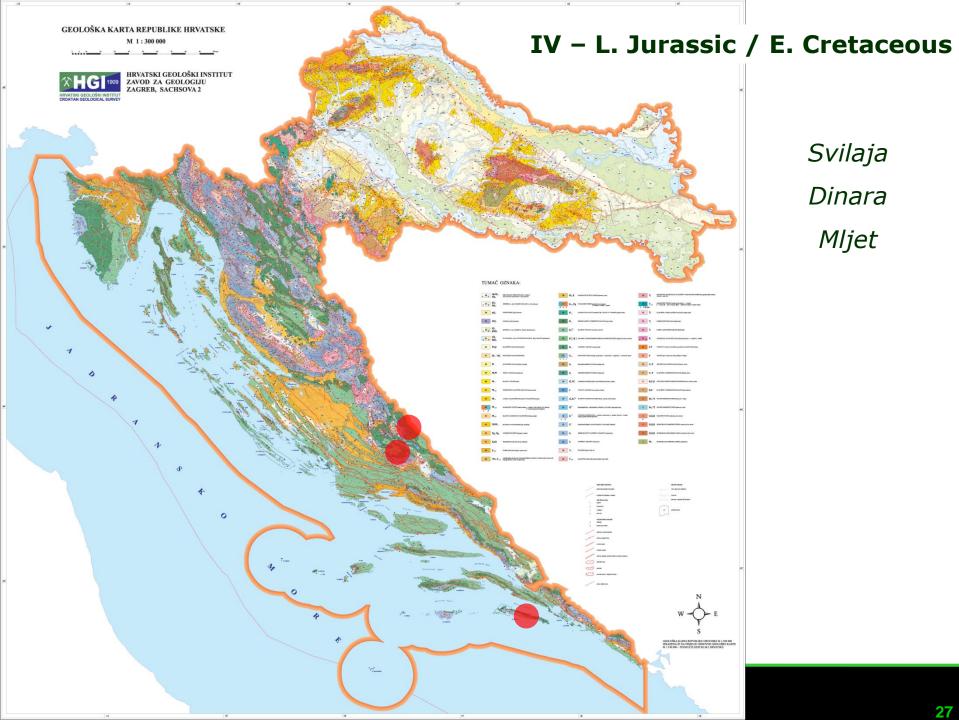
Rovinj I deposit





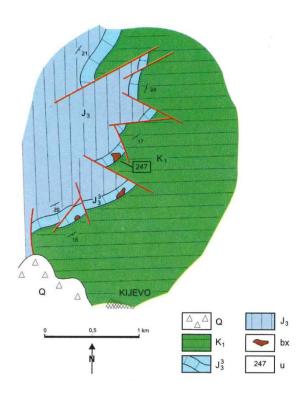
IV – L. Jurassic / E. Cretaceous

L. Tithonian / Valanginian-Hauterivian-Barremian-Aptian



Svilaja Dinara Mljet

Kijevo deposit



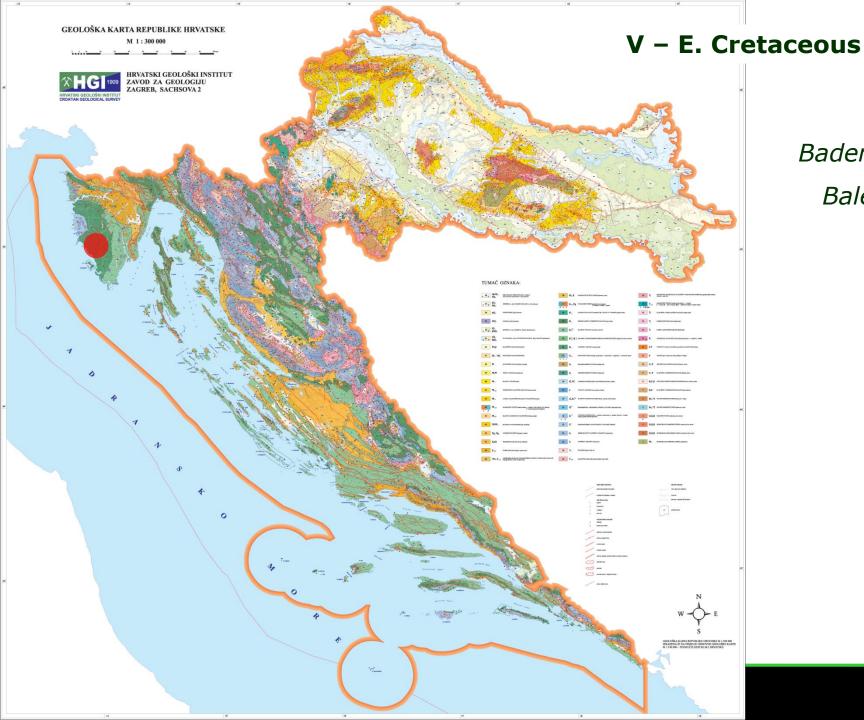
Marković, 2002



| | 1/4 | £73 | erio _Q | | | | 1/4 | E73 | Sorior | > | | |
|-------------|-------------|------------|-------------------|--|--------------------------------------|-------|-------------------|---------------|---------------|-------------|----------------------|--|
| Eon. | Erath on /E | System Era | Series / Epoch | Stage / Age | numerical age (Ma) | EODE. | Erath Officen / E | System (Era | Ser Ser | ies / Epoch | Stage / Age | |
| | | Z | Holocene M/L/E | Meghalayan Northgrippian Greenlandian Upper | present 0.0042 0.0082 | | | | | | Tithonian | ~ 145.0 |
| | | rna | L/E | | 0.0117 0.126 | | | | | Upper | Kimmeridgian | 152.1 ±0.9 |
| | | Quaternary | Pleistocene | Middle | 0.781 | | | | | | Oxfordian | 157.3 ±1.0 |
| | | Jus | | Calabrian < | 1.80 | | | 0 | | | Callovian | 163.5 ±1.0 166.1 ±1.2 |
| | | 0 | | Piacenzian | 2.58 | | | Jurassic | | Middle | Bathonian Sajocian | 168.3 ±1.3 |
| | | | Pliocene | Zanclean < | 3.600 | | | ras | A. | viidaio | Aalenian < | 170.3 ±1.4 |
| | | Neogene | | Messinian < | 5.333 | | | J | | | Toarcian | 174.1 ±1.0 |
| | | | | Tortonian 🖪 | 7.246 | | | | | | Toarcian | 182.7 ±0.7 |
| | | | Miocene | Serravallian s | 11.63 | | Mesozoic | | | Lower | Pliensbachian < | 190.8 ±1.0 |
| | ಲ | | | Langhian | 13.82 | | 302 | | | | Sinemurian _ | 190.0 11.0 |
| | Cenozoic | _ | | Burdigalian | 15.97 | | les | | | | Hettangian | 199.3 ±0.3 201.3 ±0.2 |
| | no | | | Aquitanian < | 20.44 | | 2 | | | | Rhaetian | 201.3 ±0.2 |
| | Ce | | | Chattian s | 23.03 | | | | | | | ~ 208.5 |
| | | | Oligocene | | 27.82 | | | | | Upper | Norian | |
| | | | | Rupelian | 33.9 | | | sic | | | | ~ 227 |
| | | Ф | | Priabonian | | | | Triassic | | | Carnian | |
| | | Paleogene | _ | Bartonian | 37.8 41.2 | | | F | | | Ladinian 🔇 | ~ 237 |
| Phanerozoic | | og | Eocene | Lutetian < | 47.8 47.8 56.0 59.2 61.6 | | | Middle | | Anisian | ~ 242 | |
| Z0. | | ale | | Vi | | Z0. | | | | Lower | Olenekian | 247.2 251.2 |
| Jer | | Ф | | Ypresian | 56.0 | 56.0 | | | Lower | | Induan Changhsingian | 251.902 ±0.024 |
| Jai | | | | Thanetian < | 59.2 | Jai | | | Lopingian | | Wuchiapingian < | |
| Ы | | | Paleocene | Selandian < | 61.6 | 百 | | | | | Capitanian | 259.1 ±0.5 |
| | | | | Danian < | 66.0 | | | | Gur | adalupian | | 265.1 ±0.4 |
| | | | | Maastrichtian 📢 | | | | lan | Gua | auaiupiaii | D " | 200.0 ±0.5 |
| | | | | | 72.1 ±0.2 | | | E | | | | 272.95 ±0.11 |
| | | | | Campanian | 83.6 ±0.2 | | | Permian | | | Kungurian | 283.5 ±0.6 |
| | | | Upper | Santonian < | 86.3 ±0.5 | | | | Ci | suralian | Artinskian | |
| | | | | Coniacian | 89.8 ±0.3 | | ပ | | Oi | Suranan | Sakmarian 🗸 | 290.1 ±0.26 |
| | | S | | Turonian 🔬 | | | Paleozoic | | | | Asselian | 293.52 ±0.17 |
| | Sic | Cretaceous | | Cenomanian a | 93.9 | | 60 | | LE L | | Gzhelian | 290.9 ±0.13 |
| | Mesozoic | ce | | Ceriornaman | 100.5 | | Pal | | ylvanian | Upper | Kasimovian | 303.7 ±0.1 307.0 ±0.1 |
| | es | eta | | Albian | | | ш | | sylv | Middle | Moscovian | |
| | Σ | Ö | | • | | | | no | Penns | | | 315.2 ±0.2 |
| | | | | Aptian | | | | fer | Pe | Lower | Bashkirian < | 323.2 ±0.4 |
| | | | | Barremian | ~ 125.0 | | | oni | ä | Upper | Serpukhovian | enough the control of |
| | | | Lower | Hauterivian | ~ 129.4 | | | arbo | ppia | | | 330.9 ±0.2 |
| | | | | | ~ 132.9 | | | Carboniferous | Middle | | Visean | 040 7 0 4 |
| | | | | Valanginian | ~ 139.8 | | | | Mississippian | | | 346.7 ±0.4 |
| | | | | Berriasian | ~ 145.0 | | | | ≥ | Lower | Tournaisian | 358.9 ±0.4 |
| | | | | | 1-10.0 | | | | | | | - 000.0 10. 1 |

V – **E.** Cretaceous

Barremian-E. Aptian / L. Albian

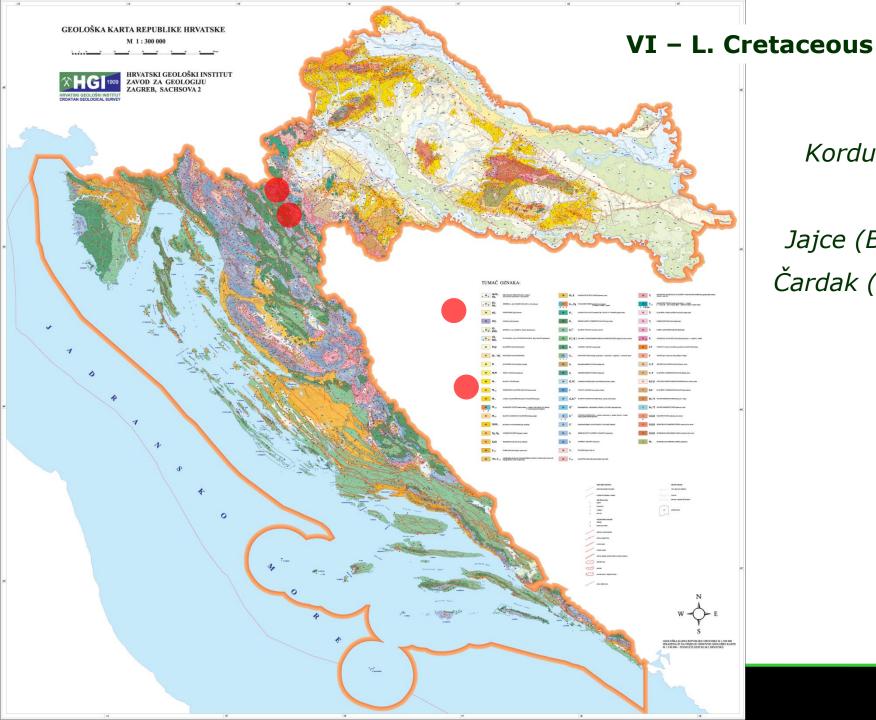


Baderna Bale

| | 1/4 | (F. 20) | Peniod | | | | 2/4 | Er3 | , 00 | 0 | | | |
|-------------|-------------|------------|----------------|--|-----------------------------|-------------|-----------|---------------|---------------|--------------|---------------------------------------|--------------------------|------------|
| Eon. | Erath on /E | System Era | Series / Epoch | Stage / Age | numerical age (Ma) | Fonce | Erath on | System Fra | Se | ries / Epoch | Stage / Age | | |
| | | Z | Holocene M/L/E | Meghalayan Northgrippian Greenlandian Upper | present 0.0042 0.0082 | | | | | | Tithonian | ~ 145.0 | |
| | | Quaternary | L/E | | 0.0117 0.126 | | | | | Upper | Kimmeridgian | 152.1 ±0.9 | |
| | | ate | Pleistocene | Middle | 0.781 | | | | | | Oxfordian | 157.3 ±1.0 | |
| | | Sus | | Calabrian < | 1.80 | | | 0 | | | Callovian | 163.5 ±1.0 166.1 ±1.2 | |
| | | 0 | | Gelasian Piacenzian | 2.58 | | | Jurassic | | Middle | Bathonian S | 168.3 ±1.3 | |
| | | | Pliocene | Zanclean < | 3.600 | | | ras | | Wildulo | Bajocian S Aalenian S | 170.5 11.4 | |
| | | 4 | | Messinian 📢 | 5.333 | | | 3 | _ | | 10 | 174.1 ±1.0 | |
| | | Neogene | Miocene | Tortonian 📢 | 7.246 | | | | | | Toarcian | 102.7 ±0.7 | |
| | | | | Serravallian s | 11.63 | | Mesozoic | | | Lower | Pliensbachian < | 100.0 .1.0 | |
| | O | | | Langhian | 13.82 | | OZ | | | | Sinemurian _ | 190.8 ±1.0 | |
| | Cenozoic | | | Burdigalian | 15.97 | | les | | | | Hettangian < | 199.3 ±0.3 | |
| | 00 | | | | 20.44 | | 2 | | | | Rhaetian | 201.3 ±0.2 | |
| | Sel | | | , | 23.03 | | | | | | Ttriactian | ~ 208.5 | |
| | | | Oligocene | Chattian < | 27.82 | | | | Upper | | Norian | | |
| | | | Oligocerie | Rupelian | 22.0 | | | sic | | орро. | | ~ 227 | |
| | | a) | | Priabonian | 33.9 | | | Triassic | | | Carnian | 221 | |
| | | Paleogene | | Bartonian | 37.8 | | | Ë | | | Ladinian < | ~ 237 | |
| Sic | | obc | Eocene | Lutetian | 41.2 | Si | | | Middle | | | ~ 242 | |
| Phanerozoic | | lec | | Latetian | 47.8 | Phanerozoic | | | | | Anisian Olenekian | 247.2 | |
| erc | | Ра | | Ypresian | 56.0 | erc | | | | Lower | Induan 🧲 | 251.2 251.902 ±0.02 | |
| an | | | | Thanetian < | 59.2 | an | | | Lopingian | | Changhsingian | | |
| Ph | | | Paleocene | Selandian < | 61.6 | P | | | _ | opingian | Wuchiapingian | 259.1 ±0.5 | |
| | | | | Danian 🔬 | | | | | | | Capitanian < | 265.1 ±0.4 | |
| | | | | Maastrichtian 📢 | 66.0 | | | Ę | Gu | adalupian | Wordian < | | |
| | | | | Waastrichtan | 72.1 ±0.2 | | | nië | | | Roadian < | 272.95 ±0.11 | |
| | | | | Campanian | | | | Permian | | | Kungurian | | |
| | | | Linner | Santonian 🔨 | 83.6 ±0.2 | | | Ф | | | Artinskian | 283.5 ±0.6 | |
| | | | Upper | Coniacian | 86 | | | | С | isuralian | | 290.1 ±0.26 | |
| | | | | | | | Paleozoic | | | | Sakmarian < | 293.52 ±0.17 | |
| | O | ns | | Turonian | | | OZ | | | | Asselian < | 298.9 ±0.15 | |
| | Mesozoic | Cretaceous | | Cenomanian | 100.5 | | ale | | Pennsylvanian | Upper | Gzhelian | 303.7 ±0.1 | |
| | SO. | ac | | Albian | 100.5 | | P | | Ivar | | Kasimovian | 307.0 ±0.1 | |
| | Ne | ret | | Albian 🔨 | ~ 113.0 | | | sn | ISY | Middle | Moscovian | 315.2 ±0.2 | |
| | _ | O | | Aptian | - 113.0 | | | 016 | eni | Lower | Bashkirian _ | | |
| | | | | Aptian | ~ 125.0 | | | Jife | | A ar | | 323.2 ±0.4 | |
| | | | 1 | Barremian | | | | Carboniferous | ian | Upper | Serpukhovian | 330.9 ±0.2 | |
| | | | Lower | Hauterivian | ~ 129.4 | | | ar | id Middle | | Visean | | |
| | | | | Valanginian | ~ 132.9 | | | ပၱ | Mississippian | Siss | | V100a11 | 346.7 ±0.4 |
| | | | | Berriasian | ~ 139.8 | | | | Mis | Lower | Tournaisian | STREAMER SUPERING | |
| | | | | Demasian | ~ 145.0 | | | | | | , , , , , , , , , , , , , , , , , , , | 358.9 ±0.4 | |

VI - L. Cretaceous

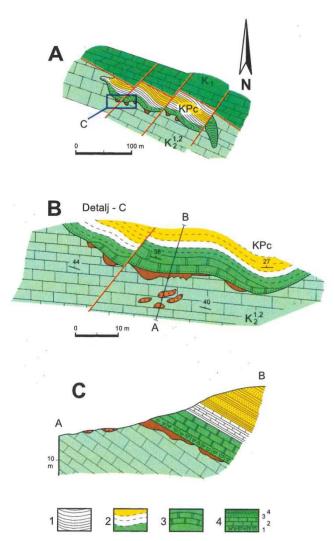
Cenomanian-Turonian / 'Senonian'



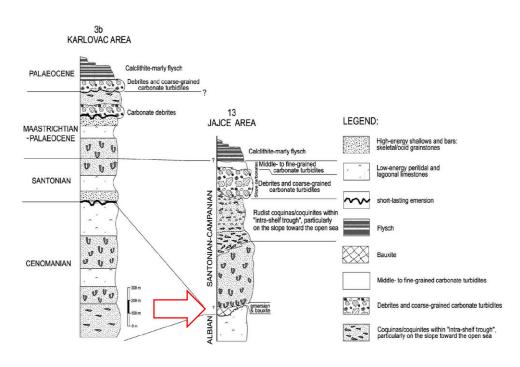
Kordun

Jajce (BH) Čardak (BH)

Gazibare-Živkovići deposit

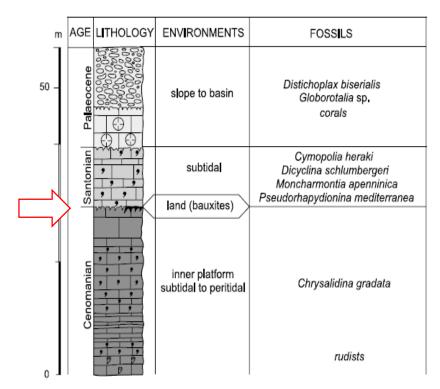


Marković, 2002

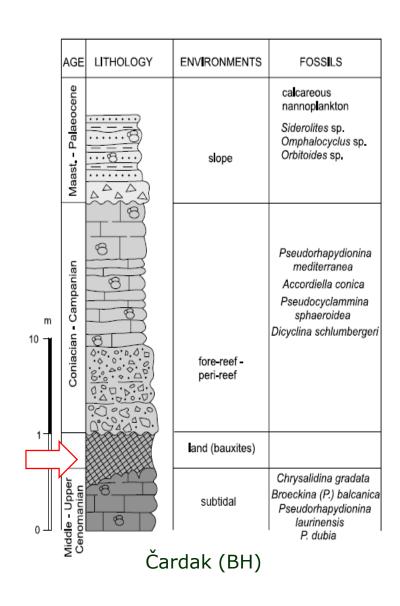


Jajce (BH)

Vlahović et al., 2005



Dubravčani

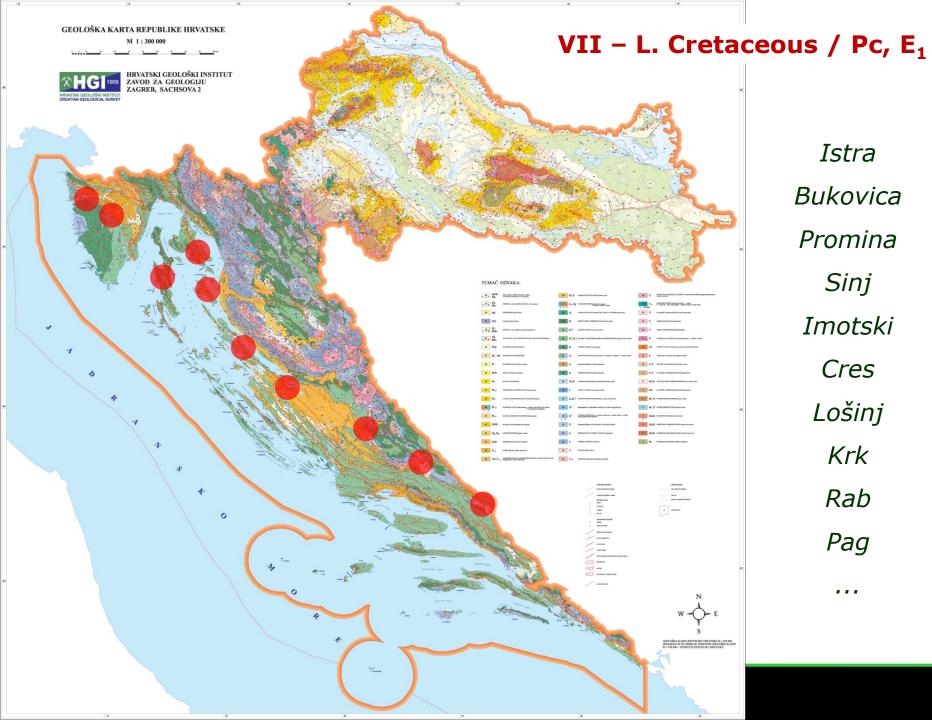


Dragičević & Velić, 2002

Eonothem/Eon Eramom/Era GSSP numerical numerical Series / Epoch Stage / Age age (Ma) Series / Epoch Stage / Age age (Ma) ~ 145.0 Meghalayan Northgrippian Quaternary Holocene **Tithonian** Greenlandian 152.1 ±0.9 0.0117 Upper Upper Kimmeridgian 0.126 Middle 157.3 ±1.0 Pleistocene 0.781 Oxfordian Calabrian 163.5 ±1.0 1.80 Callovian Gelasian 166.1 ±1.2 2.58 Bathonian 168.3 ±1.3 Middle Piacenzian Bajocian 170.3 ±1.4 Pliocene 3.600 Zanclean Aalenian 5.333 174.1 ±1.0 Messinian Toarcian Neogene 7.246 182.7 ±0.7 Tortonian 11.63 Mesozoic Pliensbachian 🚮 Serravallian < 190.8 ±1.0 13.82 Miocene Cenozoic Langhian 15.97 199.3 ±0.3 Burdigalian 201.3 ±0.2 20.44 Rhaetian Aguitanian 23.03 ~ 208.5 Chattian 27.82 Norian Oligocene Triassic Rupelian ~ 227 33.9 Priabonian Carnian Paleogene 37.8 ~ 237 Bartonian 41.2 Phanerozoic erozoic ~ 242 Eocene Lutetian 47.8 247.2 Olenekian 251.2 Lower Ypresian 251.902 ±0.024 Changhsingian < 254.14 ±0.07 Thanetian Lopingian Wuchiapingian < Paleocene Selandian 259.1 ±0.5 Capitanian Danian 265.1 ±0.4 Wordian Guadalupian 268.8 ±0.5 Maastrichtian < Roadian 272.95 ±0.11 Campanian Kungurian 283.5 ±0.6 Santonian Upper Artinskian Cisuralian 290.1 ±0.26 Coniacian Paleozoic Sakmarian 293.52 ±0.17 Turonian Cretaceous Asselian 93.9 298.9 ±0.15 Mesozoic Pennsylvanian Cenomanian Gzhelian Upper 303.7 ±0.1 100.5 Kasimovian 307.0 ±0.1 Albian Middle Moscovian ~ 113.0 315.2 ±0.2 Lower Bashkirian **Aptian** 323.2 ±0.4 ~ 125.0 Carboni Upper Serpukhovian Barremian 330.9 ±0.2 ~ 129.4 Lower Hauterivian Middle Visean ~ 132.9 Valanginian 346.7 ±0.4 ~ 139.8 Lower Tournaisian Berriasian ~ 145.0 358.9 ±0.4

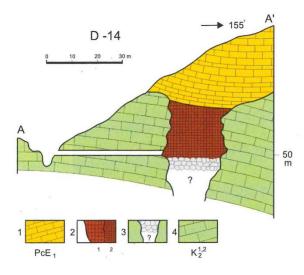
VII - L. Cretaceous / Pc, E₁

Cenomanian-Turonian-'Senonian' / Palaeocene(?)-E. Eocene

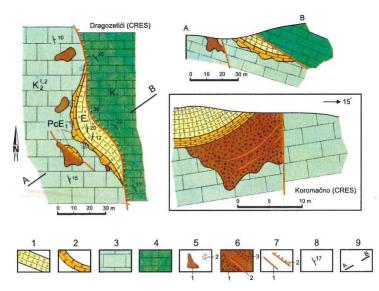


Istra Bukovica Promina Sinj Imotski Cres Lošinj Krk Rab Pag

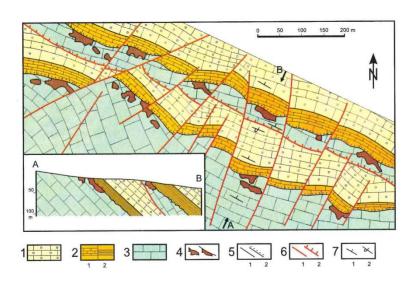
Mirna Valley (Istria)



Cres Island



Ričice (Imotski)



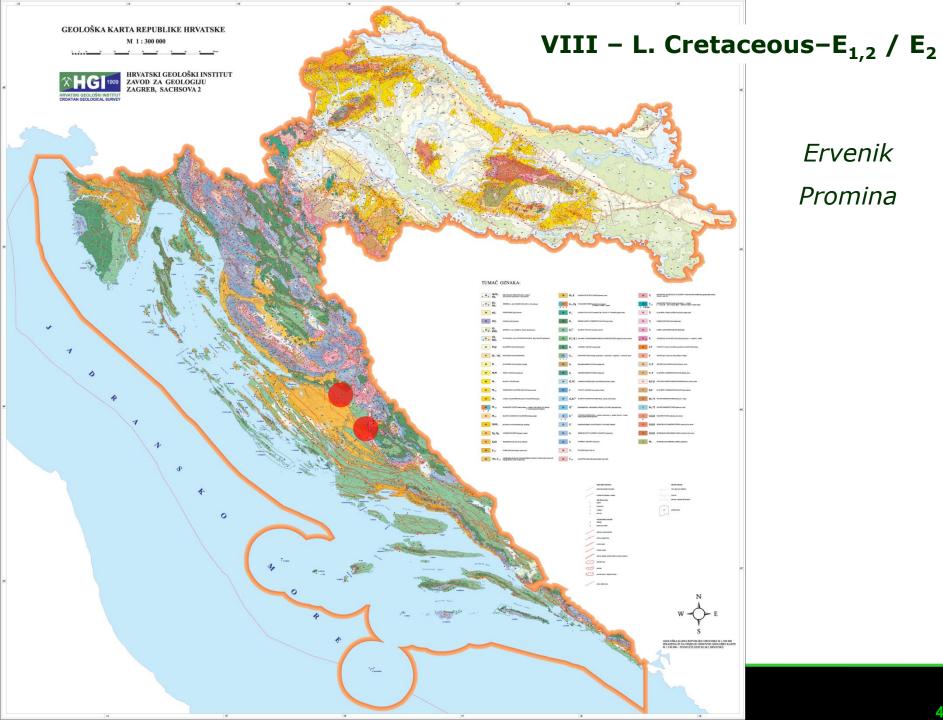
Marković, 2002



| | 3/4 | (F. 70) | Politica | | (6) (A) | Poriod | | | | | |
|-------------|------------------|------------|----------------|--|-----------------------------|------------------|-------------------|--------------------|------------------------|---------------------|--------------------------|
| Fon | Erath Othern / E | System Era | Series / Epoch | Stage / Age | numerical age (Ma) | Egno, | Erath Officen / E | System (Era | Series / Epoch | Stage / Age | |
| | | Z | Holocene M/L/E | Meghalayan Northgrippian Greenlandian Upper | present 0.0042 0.0082 | | | | | Tithonian | ~ 145.0 |
| | | Quaternary | L/E | | 0.0117 0.126 | | 0 | Jurassic | Upper | Kimmeridgian | 152.1 ±0.9 |
| | | | Pleistocene | Middle | 0.781 | | | | | Oxfordian | 157.3 ±1.0 |
| | | | | Calabrian < | 1.80 | | | | | Callovian | 163.5 ±1.0 166.1 ±1.2 |
| | | | Pliocene | Piacenzian | 2.58 | | | | Middle | Bathonian Sajocian | 168.3 ±1.3 |
| | | | | Zanclean 🔇 | 3.600 | | | | | Aalenian < | 170.3 ±1.4 |
| | | Neogene | Miocene | Messinian < | 5.333 7.246 | | | | Lower | Toarcian | 174.1 ±1.0 |
| | | | | Tortonian ≼ | 11.63 | | | | | | 182.7 ±0.7 |
| | Cenozoic | | | Serravallian < | 13.82 | | ZO | | | Pliensbachian 4 | 190.8 ±1.0 |
| | | | | Langhian | 15.97 | | Mesozoic | | | Sinemurian 🤦 | |
| Phanerozoic | | | | Burdigalian | 20.44 | | | | | Hettangian < | 199.3 ±0.3 201.3 ±0.2 |
| | | | | Aquitanian 📢 | 23.03 | | | | | Rhaetian | B3065000 TOOLS |
| | Ö | Paleogene | Oligocene | Chattian ≼ | | | | | | | ~ 208.5 |
| | | | | Rupelian | 27.82 | | ပ | Upper | Norian | | |
| | | | | . 1 | 33.9 | | | Triassic | | | ~ 227 |
| | | | Eocene | Priabonian | 37.8 | | | | | Carnian | ~ 237 |
| | | | | Bartonian | 41.2 | | Н | Middle | Ladinian 🔇 | ~ 242 | |
| | | | | Lutetian | | | | | Middle | Anisian | 247.2 |
| | | | | Ypresian | | <i>a</i> | | | Lower | Olenekian Induan | 251.2 251.902 ±0.024 |
| | | | Paleocene | Thanetian 🔇 | | ane | | | Loningian | Changhsingian < | 254.14 ±0.07 |
| h | | | | Selandian < | Phane | | | Lopingian | Wuchiapingian | 259.1 ±0.5 | |
| | | | | Danian 📢 | | | | | Capitanian < | 265.1 ±0.4 | |
| | Mesozoic | Cretaceous | Upper | Manatrialities | 6.0 | | | JL 31 | Guadalupian | Wordian < | 268.8 ±0.5 |
| | | | | Maastrichtian | 1 ±0.2 | | | πië | | Roadian < | 272.95 ±0.11 |
| | | | | Campanian | | | Permian | | Kungurian | 000 5 . 0 0 | |
| | | | | Santonian < | 6 ±0.2 | 3 ±0.5 8 ±0.3 | | | | Artinskian | 283.5 ±0.6 |
| | | | | Coniacian | CONT. (1990) | | Paleozoic | | Cisuralian | | 290.1 ±0.26 |
| | | | | Turonian 🖪 | .8 ±0.3 | | | | | Sakmarian | 293.52 ±0.17 |
| | | | | | 93.9 | | | | | Asselian < | 298.9 ±0.15 |
| | | | | Cenomanian < | 100.5 | ale | | Upper | Gzhelian Kasimovian | 303.7 ±0.1 | |
| | | | Lower | Albian | 200-200-200-2 | | ш | | Middle | Moscovian | 307.0 ±0.1 |
| | | Ü | | 4 | ~ 113.0 | | | | Ë | | 315.2 ±0.2 |
| | | | | Aptian | ~ 125.0 ~ 129.4 | | | fer | Lower | Bashkirian < | 323.2 ±0.4 |
| | | | | Barremian | | | Carboniferous | Upper Upper | Serpukhovian | 330.9 ±0.2 | |
| | | | | Hauterivian | | | | Upper Middle Lower | Viscon | 000.0 ±0.2 | |
| | | | | Valanginian | ~ 132.9 | | | ပိ | Ivildale | Visean | 346.7 ±0.4 |
| | | | | | ~ 139.8 | | | Lower | Tournaisian | 340.7 10.4 | |
| | | | | Berriasian | ~ 145.0 | | | | LOWE | Tournaisian | 358.9 ±0.4 |

VIII - L. Cretaceous- $E_{1,2}$ / E_2

Cenomanian-Turonian-E. to M. Eocene / M. Eocene



Ervenik Promina

| Ω Ω numerical Θ age (Ma) |
|--------------------------------------|
| |
| ~ 145.0 |
| 152.1 ±0.9 |
| 157.3 ±1.(|
| 163.5 ±1.0 |
| 168.3 ±1.3 |
| 170.3 ±1.4 |
| 1/4.1 ±1.0 |
| 182.7 ±0.7 |
| an < 190.8 ±1.0 |
| n 🖪 |
| 199.3 ±0.3 201.3 ±0.2 |
| 8.000.000.000.000 |
| ~ 208.5 |
| |
| ~ 227 |
| ~ 237 |
| ~ 242 |
| 247.2 |
| 251.2 |
| ian < 251.902 ±0.024 254.14 ±0.07 |
| ian < 259.1 ±0.5 |
| 265.1 ±0.4 |
| 268.8 ±0.5 |
| 272.95 ±0.11 |
| n |
| 283.5 ±0.6 |
| 290.1 ±0.26 |
| 293.52 ±0.17 |
| 298.9 ±0.15 |
| 303.7 ±0.1 |
| 307.0 ±0.1 |
| 315.2 ±0.2 |
| 323.2 ±0.4 |
| an |
| 330.9 ±0.2 |
| 4 |
| 346.7 ±0.4 |
| n 358.9 ±0.4 |
| |

IX - L. Cretaceous-Pc- $E_{1,2}$ / $E_{2,3}$ -Ol₁

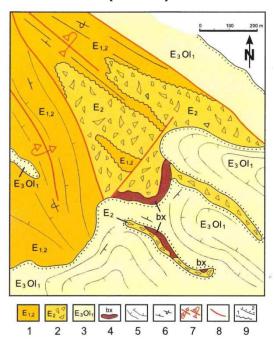
Cenomanian-Turonian-'Senonian'-E. to M. Eocene / M. to L. Eocene-E. Oligocene



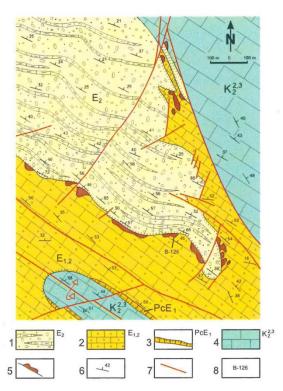
Obrovac Drniš Promina Moseć Sinj Trilj Imotski

Posušje (BH)

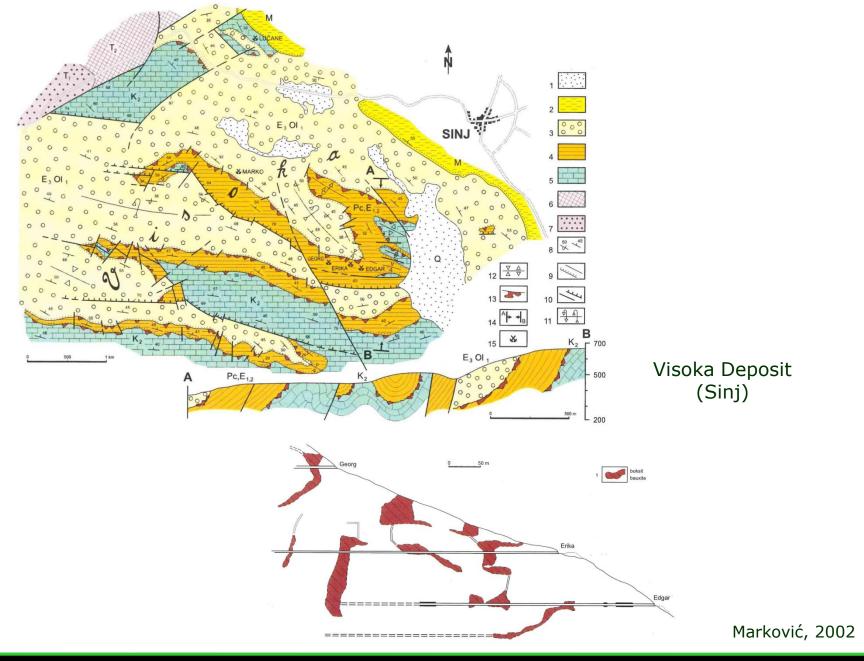
Suknovac Deposit (Drniš)

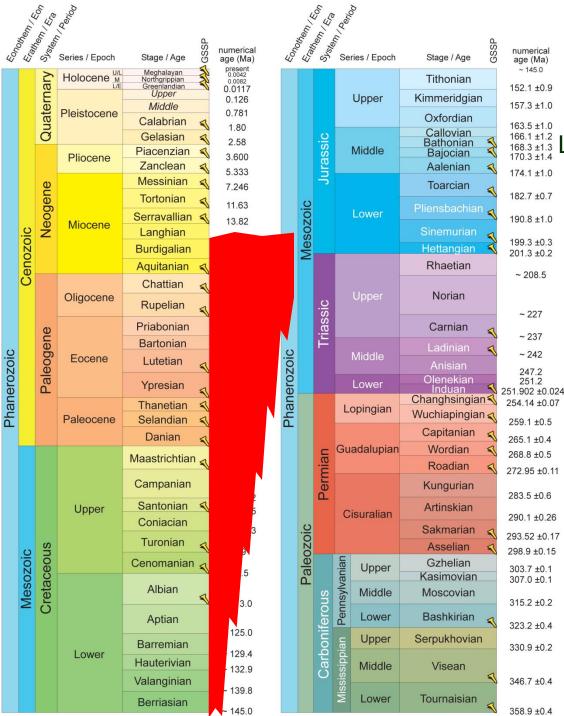


Kljaka Deposit (Moseć)



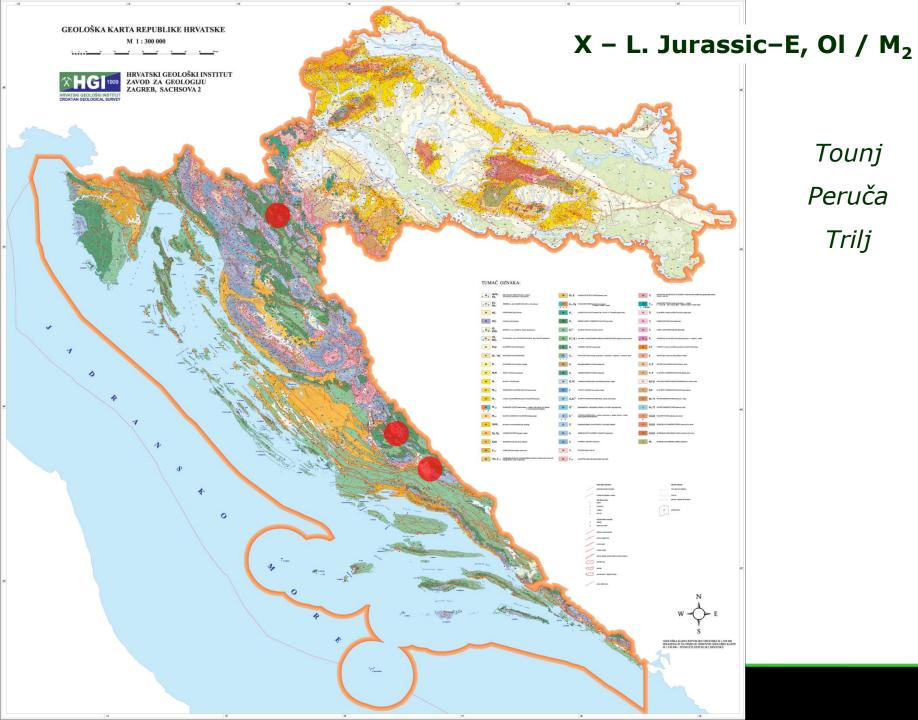
Marković, 2002



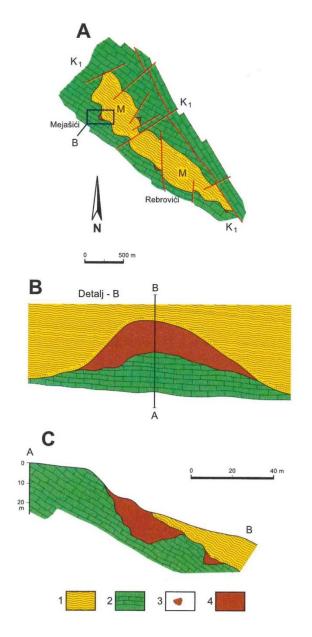


X - L. Jurassic-E, Ol / M₂

L. Jurassic-Aptian-Cenomanian-Turonian-'Senonian'-Eocene-Oligocene / M. Miocene



Tounj Peruča Trilj



Mejašići Deposit (Tounj)

Marković, 2002

Instead of conclusion

In the Croatian part of the External Dinarides bauxite occurrences and deposits may be generally divided into ten horizons, and four of them had economical value.

Several small bauxite occurrences have also been found in the Northern Croatia.

The first bauxite mine in Europe was opened in the Mirna river valley in Istria almost 400 years ago, with the first written record from 1780 and the first scientific discussion published in 1808. Those K/Pg pyritic bauxites were excavated for production of sulphuric acid and later for production of alum used for tanning in the leather industry.

German mineralogist August Breithaupt described in 1847 *cliachite* as previously unknown mineral from the Kljaka bauxite deposit near Drniš – this term is still used as a synonym for bauxite (which was described from Le Baux in 1821).

Bauxite was often unofficially cited as the 'Croatian national mineral'.

