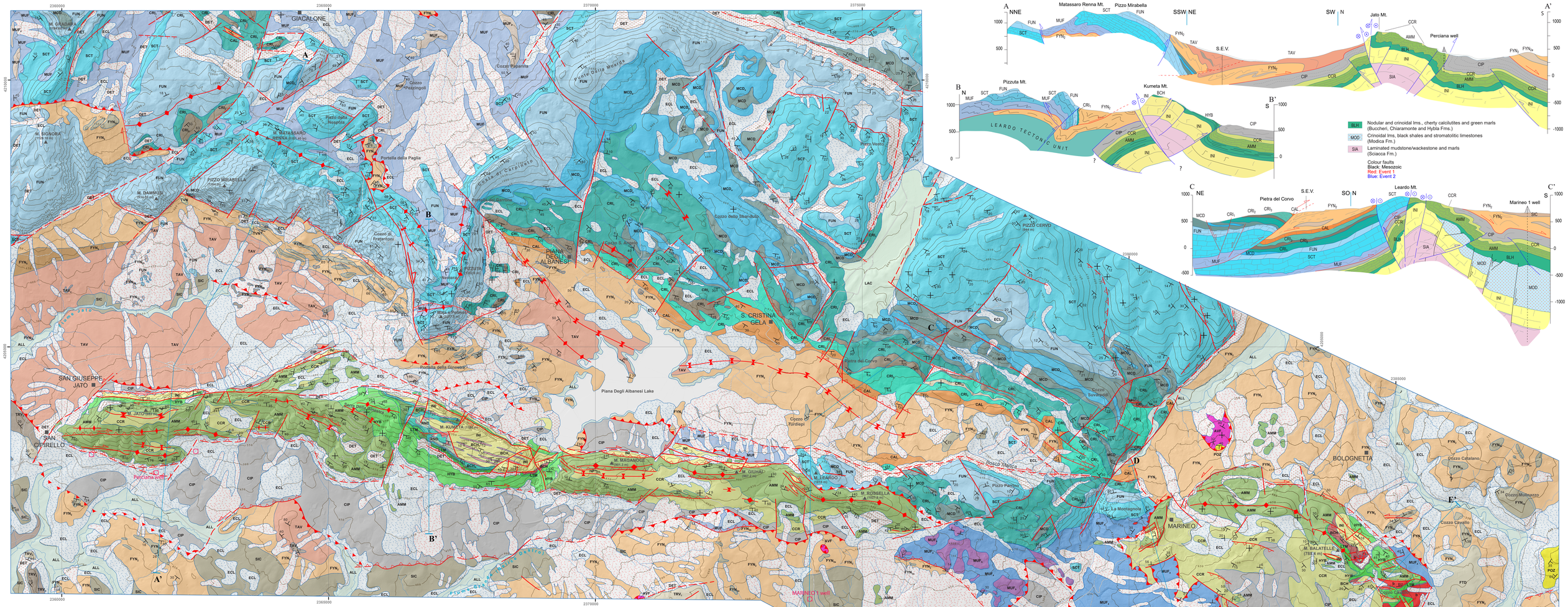
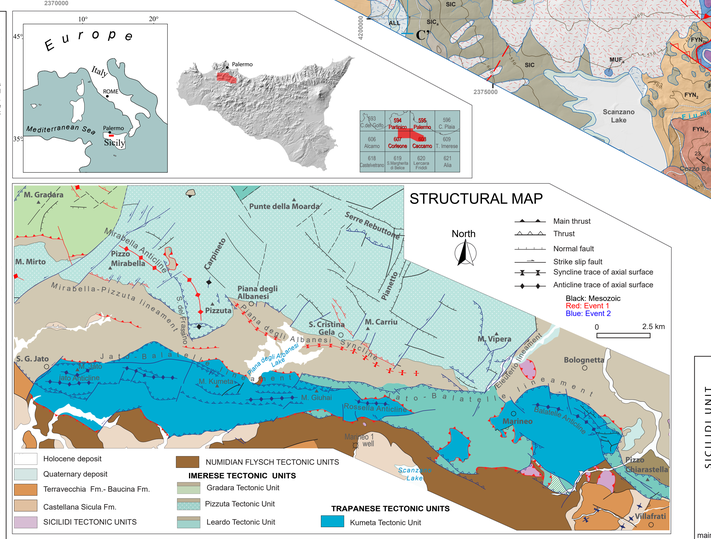
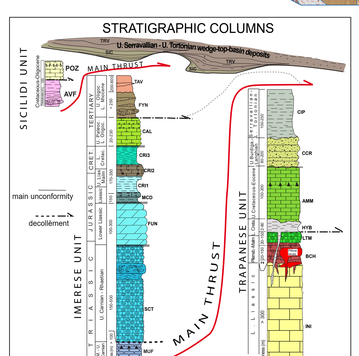
GEOLOGY OF THE KUMETA - PIZZUTA RIDGES

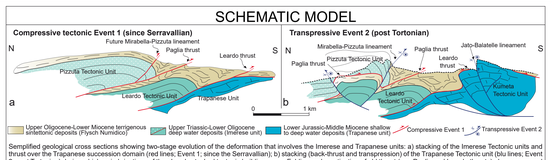
Gasparo Morticelli M., Avellone G., Sulli A., Agate M., Basilone L., Catalano R., Pierini S.
University of Palermo - Department of Earth and Marine Sciences
Email: maurizio.gasparo@unipa.it
© *Journal of Maps 2015*

Scale bar
0 0.5 1.0 1.5 2 km









Semplified geological cross sections showing two-stage evolution of the Imerese and Trapanese units: a) stacking of the Imerese Tectonic units and thrust over the Trapanese succession domain (red lines; Event 1; since the Serravallian); b) stacking (back-thrust and transpression) of the Trapanese Tectonic unit (blu lines; Event 2; post Tortonian) during which re-imbrications of the already stacked tectonic building occur. Folding and reactivation of old thrust (e.g. Paglia and Leardo thrusts) planes occurred by subsequent transpressive faults (e.g. Jato-Balatelle and Mirabella-Pizzuta lineament).

QUATERNARY DEPOSITS

Landslide. Chaotic deposits with variable grain size, emplaced due to gravitational processes.
HOLOCENE

Alluvial deposits.
HOLOCENE

Travertine.
HOLOCENE

Eluvium and colluvium. Fine grained deposits with clasts of variable size, derived from weathering of the substratum accumulated in situ or emplaced due to diffuse rill.
UPPER PLEISTOCENE - HOLOCENE

Debris. Scree and talus deposits with variable grain size. Unconsolidated or poorly cemented.
UPPER PLEISTOCENE - HOLOCENE

Lacustrine deposits. Alternated dark silt and clays.
UPPER PLEISTOCENE - HOLOCENE

Fluvial terraced deposits. Rounded to sub-rounded gravels, pebbles and boulders alternated to yellow silty sands or silty-clayey matrix. The thickness is 25 m.
MIDDLE-UPPER PLEISTOCENE

WEDGE-TOP DEPOSITS

TERRAVECCHIA

Conglomerates, sands, pelites and marls. The thickness is from 300 to 600 m. The lower boundary is an unconformity surface with SIC. Paralic-continental to deltaic environment.
UPPER TORTONIAN-LOWER MESSINIAN

pelitic-clayey member (TRV$_1$). Sandy clays, pelites and shales with benthic faunas (*Spirolectaminna carinata* and *Ammonia beccari*), passing upwards to grey, green to light-blue clayey and sandy marls with planktonic foraminifers (*Globigerinoides obliquus extremus, Globorotalitae suterae* and *Globorotalia conomiozea* biozones). The thickness is from 100 to 200 m. Lower boundary is gradual on TRV$_2$, sharp on TRV$_1$. Shelf to slope environment.

sandy member (TRV$_2$). Yellowish to grey sandy arenites, with cross-stratification, alternated to sandy pelites and interbedded coastal shell arenites and calcareous-arenaceous turbidites. They contain benthonic paleoicpoda foraminifera (*Spirolectaminna carinata, Ammonia beccari tepida*), rare planktonic foraminifera (*Globigerinoides obliquus extremus* biozone) and calcareous nannofossils (*Minylitha convallis* biozone). The thickness is from 50 to 250 m. Lagoon, sometimes brackish-water, coastal shelf to slope environment.

conglomeratic member (TRV$_3$). Reddish and yellowish polymitic orto-paraconglomerates, alternated with sandstones and pebbly coarse sands. The thickness is from 0 to 250 m.

CASTELLANA SICULA

Yellow-reddish shales and sandy pelites with rare planktonic foraminifera (*Neoglobocuadrina praetiantica* and *Neoglobocuadrina acrostoma* biozones) and benthic foraminifers (*Ammonia inflata, Elphidium* spp.), with interbedded sandstones and mud-supported microconglomerates (SIC$_4$). The thickness is from 20 to 250 m.
UPPER SERRAVALLIAN-LOWER TORTONIAN

SICILIDE DOMAIN SUCCESSION

POLIZZI

White marly limestones locally laminated, and thin bedded bioclastic packstone with planktonic foraminifers (*Turborotalia cerroazulensis* biozone). Thickness ranges from 10 to 20 m. Basin and slope environments.
UPPER EOCENE

VARICOLOURED CLAYS

Varicoloured shales and argillites locally laminated, cleavable or scaly, often tectonized, and locally red-greenish marls, with planktonic foraminifera and nan-nofossils (*Arkhangelskiella cymbiformis* and *Nephrolithus frequens*, [CC 25-26]). The thickness ranges from 20 to 50 m. Abyssal plain environment.
MAASTRICHTIAN

FOREDEEP DEPOSITS

TAVERNOLA

Grey-greenish marls and pelites with interbedded thick layers of yellowish-greenish quartzarenites (TAV$_2$) with abundant glauconite and planktonic foraminifera (*Globoquadrina dehiscens dehiscens-Catapsydrax dissimilis, Globigerinoides trilobus* and *Praeorbulina glomerosa* s.l. biozones) and calcareous nannofossils of the MNN 1c-d, MNN4a, MNN5a biozones. The thickness exceeds 200 m. Slope and turbidite fan environment.
UPPER AQUITANIAN-LANGHIAN

NUMIDIAN FLYSCH

Geraci Siculo member (FYN$_1$). Yellowish quartz sandstones with interbedded shales, clayey sands and micaceous pelites. Quartzarenitic layers, locally characterized by Bouma sequences and channalized microconglomeratic levels with clay pebbles and arenaceous-pelitic matrix (FYN$_{cg}$) with variable thickness, occur. The poor fossil content includes aggluinative planktonic foraminifers (*Globigerina angulisuturalis, Catapsydrax dissimilis, Globoquadrina dehiscens dehiscens, Globigerinoides* spp., rare *Praeorbulina* spp.) and calcareous nannofossils (MNN1b and MNN2b biozones). 50 to 200 m-thick. Turbidific fan environment.
UPPER AQUITANIAN-BURDIGALIAN

Portella Colla member (FYN$_2$). Brown Mn-rich pelites with planar lamination and argillites alternating upwards with rare channelized quartz-sandstones (FYN$_{sh}$). On the bottom frequent lens of calcarenites and calciruditles with reworked large benthic foraminifera (*Lepidocyclina* spp., FYN$_{ca}$). In the medium-upper part carbonate megabreccias and arenaceous megaconglomerates (San Salvatore megabreccias, FYN$_{br}$). In the pelites agglutinated foraminifera (*Cyclammina* spp., *Hyperammina* spp., *Ammodiscus* spp.), planktonic (*Globorotalia opima opima, Globigerina ciperoensis ciperoensis* and *Globoquadrina dehiscens dehiscens-Catapsydrax dissimilis* biozones) and calcareous nannofossils (NP24, NP25, MNN 1b biozones). Maximum thickness 300 m. Base of slope, slope environments.
CHATTIAN-LOWER AQUITANIAN

IMERESE BASIN SUCCESSION

CALTAVUTURO

Red, pink and white marly limestones with planar lamination and clayey marls, sometimes scaly, grey marls upwards. Breccias and bioclarcarenites with resedimented large benthic foraminifers (nummulitids and alveolinids), with lenticular geometry are interlayered in the upper portion of the succession. Radiolarians, sponge spicules, planktonic foraminifera (*Morozovella velascoensis, M. formosa formosa, M. aragonensis, Turborotalia cerroazulensis* s.l., *Cassigerinella chipolensis-Pseudohastigerina micra* biozones) and calcareous nannofossils (NP9, NP14-20 and NP23 biozones), occur. Thickness is from 40 to 120 m.
UPPER PALEOCENE-LOWER OLIGOCENE

CRISANTI

marly spongolithitic member (CRI$_1$). Radiolarian mudstone, polychrome siliceous shales with alternated with reddish siliceous marls, pink and cleavable upwards with sponge spicules, radiolarians, ostracods, benthonic and planktonic foraminifera (*Tritinella primula, Rotalipora boinensis* and *Rotalipora apennnica* biozones). The thickness ranges from 50 to 70 m. Slope to basin environment.
HAUTERIVIAN-ALBIAN

ellipsactinia bressicana member (CRI$_2$). Grey resedimented bioclalcirudites and bioclarcarenites, passing upwards to calcareous breccias and conglomerates with carbonate platform elements. They contain fragments of *Ellipsactinia* sp., bivalves, corals, calcareous algae, crinoids, foraminifera, brittinoides. They belong to the *Clypeina jurassicala, Crassicolaria, Calpionella, Lithocodium* aggregatum and *Tubiphytes morronensis* biozones. The thickness is from 20 to 40 m. Base of slope environment.
TITHONIAN-NEOCOMIAN

radiolarian member (CRI$_3$). Polychrome siliceous calcilutites, siliceous mudstone and black radiolarites, bedded cherts, siliceous shales (*mudshales*) with radiolarians and sponge spicules. The thickness is from 80 to 150 m. The age arises from the stratigraphic position. Deposotional slope to basin environment.
UPPER TITHONIAN-LOWER TITHONIAN

CRINOIDAL LIMESTONES AND ALTOFONTE BRECCIAS

Bioclarcarenites with crinoids fragments alternating grey-greenish clayey marls with interbedded upwards resedimented layers of bioclarcirudites and breccias (MCD$_4$) with elements of triassic reef and turbiditic calcarenites with alternating marls. The crinoidal limestones hold benthonic foraminifera, calcareous nannofossils pertaining to the NP. 4a, 5a biozones, and dinoflagellate cysts (*Membrocodonium* spp.). Thickness ranges from 70 to 120 m. Upper slope environment.
UPPER SINEMURIAN-LOWER TOARCIAN

FANUSI

White greyish graded dolorudites and dolarenites in metric strata, often vacuolar, locally passing to grey dolomitic limestones. Due to pervasive dolomitization there are only fossils ghosts. The thickness is from 80 to 300 m. The age arises from the stratigraphic position. Base of slope environment.
HETTANGIAN-LOWER SINEMURIAN

SCILLATO

Greyish laminated calcilutites with chert nodules alternating with marls (couplet marls-calcilutites), passing downwards to microcrystalline calcilutites, gradated and laminated calciruditles, upwards to dolomitic limestones. The thickness is from 200 to 400 m. They contain pelagic bivalves (*Halobia* spp.), radiolarians, calcisipher and conodonts (*Paragondolella polygnathiformis nona, P. carpathica, Epigondolella pseudodiebeli, Metapolygnatus communisti*). Pelagic and slope toe environment.
UPPER CARNIAN-RHAETIAN

MUFARA

Greyish laminated calcilutites, brown-yellowish marls, alternating with greyish biocalcarenites bearing radiolarians, conodonts, pelagic bivalvia, crustacean, echinoids, microgasteropods, ammonoids. Pelites, calcilutites, and undifferentiated clastic carbonates (MUF$_1$). Brown-yellowish shales and marls interbedded with grey-green micaceous marls (MUF$_{sh}$). Thin layers of grey-black laminated calcilutites, locally dolomitized, are prevailing (MUF$_{cl}$). Fossil content: Posidonomya gemellaro, Halobia sp, Daonella sp., pyritized gastropods, radiolarians, sponge spicule, conodonts (*Epigondolella bidentata* tethydis and *Paragondolella polygnathiformis nona* biozones). Plurimetric intercalations of dolomitized limestones and well–cemented resedimented calcareous breccias with rentic elements (Tubiphytes spp. calcareous algae, sponge fragments, hydrozoans; MUF$_{cg}$). Basaltic lavas and ultrabasic veins are locally found. The thickness is from 50 to 100 m. Pelagic to slope environment.
MIDDLE–UPPER CARNIAN

TRAPANESE PELAGIC-CARBONATE PLATFORM SUCCESSION

SAN CIPIRELLO MARLS

Grey-light and bluish shales, clayey and sandy marls, with planktonic foraminifers (MMi 5, 6, MMi 7, MMi 9 (pars) and *Neogloboquadrina acostaensis* biozones) and calcareous nannofossils (MNN 6a and MNN 7a and *Minylitha convallis* biozones). The maximum thickness is 180 m.
Hemipelagic environment.
SERRAVALLIAN-LOWER TORTONIAN

CORLEONE CALCARENITES

Bioclarcirudites, bioclarcarenites and glauconitic sandstones with cross-stratification (a glauconitic breccia occurs at the base) with alternating brown greenish sandy marls. Estimated thickness 5-40 m. They contain large benthonic foraminifera (*Miogypsina* spp.), shark teeth (*Carcharodon* sp.) and planktonic foraminifera pertaining to the *Globoquadrina dehiscens dehiscens-Catapsydrax dissimili, Globigerinoides trilobus* and *Praeorbulina glomerosa s.l.* biozones. Open shelf environment.
BURDIGALIAN-LANGHIAN

AMERILLO

Dark grey marly limestones, thin bedded milk-white cherty limestones. Upwards massive limestones passing to "wax appearing" very fine limestones with alternating white-pink calcilutites. Total thickness up to 200 m. They contain radiolarians, planktonic foraminifers (*Dizarrieta asymetrica, Globotruncanita calcarata, Globotruncanella havanensis, Ganssarina gansseri, Globigerinatheka semiinvoluta* and *Turborotalia cerroazulensis s.l* biozones) and calcareous nannofossils of the CC 17-26 biozones. Pelagic platform environment.
UPPER CRETACEOUS-EOCENE

HYBLA

Cherty marly calcilutites and greenish marls with calcareous plankton, with interbedded organic matter-bearing layers. The thickness is from 20 to 80 m. Its age dated by benthonic foraminifera, radiolarians, calcareous nannoplankton (CC 2-6 and CC5 biozones) and planktonic foraminifera (*Ticinella primula, Shackoina cabri, Globigerinelloides algerianus* biozones). Pelagic carbonate platform environment.
UPPER VALANGINIAN-ALBIAN

LATTIMUSA

Pink and whitish thin-bedded cherty marly limestones and calcilutites, with *Calpionellae* (*Crassicolaria, Calpionella, Calpionellopsis* and *Calpionellites* biozones), brachiopods (*Pygope*), rare ammonites, radiolarians, foraminifera, calcisphers and calcareous nannofossils (*Nannoconus steinmanni*). Maximum thickness 20 m. Pelagic platform environment.
UPPER TITHONIAN-LOWER VALANGINIAN

BUCCHERI (BCH)

Red nodular ammonitic limestones, pelagic limestones, radiolarites and bedded cherts, white-pink pseudonodular limestones, condensed layers with Fe–Mn crusts. Pelagic carbonate platform environment.
TOARCIAN-TITHONIAN
upper ammonitico rosso (BCH$_1$). Reddish nodular limestones with cephalopods and Fe-Mn crusts and pinnacles at the base, intersected by sedimentary sills. The thickness is 2-12 m. Neptunian dykes. Metric intercalations (up to 70 m-thick) of (a) pelitic lavas, hyaloclastites, well–bedded grey–greenish siliceous arenites and tuffitic layers containing molluscs and crustacean fauna. It's age-dated to the *LOWER TOARCIAN-MIDDLE OXFORDIAN* by *Bositra* sp. and several ammonites biozones.

CRINOIDAL LIMESTONES

Lens-shaped white-pink crinoids calcarenites, often massive, with low-angle cross-stratification. The thickness is 0-20 m. The unit is age-dated by brachiopods and stratigraphic position. Shelf environment.
UPPER PLIENSBACHIAN

INICI

White limestones and dolomitic limestones with algae (Thaumatoporella parvovesiculifera, Paleodasycladus mediterraneus), molluscs and ammonites (Arietites bucklandi and Echioceras raricostatum biozones), with alternating shallowing upwards stromatolitic and lofentic limestones. Upwards oolitic/bioclastic calcarenites with algae, foraminifera, gasteropods, crinoids. The thickness is from 400 to 500 m. At the top dense network of polyphasic neptunian dykes filled by Jurassic-Eocene pelagic limestones and Miocene glauconitic to calcareous sandstones. Back-reef lagoon, tidal flat and sand barrier environments.
HETTANGIAN-SINEMURIAN

LEGEND OF SYMBOLS
(dashed when inferred or buried)

Bedding
Overturned bedding
Vertical bedding
Horizontal bedding
Stratigraphic boundary
Undetermined fault
Overthrust
High angle revers fault
Normal fault
Strike slip fault
Transpressive fault
Trace of axial surface folds
Block-slide
Well
Trace of geological cross sections

Bedding plane

Topographic basemap:
Monte Mario Italy 2
WKID: 3004 Authority: EPSG

Projection: Transverse Mercator
False Easting: 2520000.0
False Northing: 0.0
Central Meridian: 15.0

Scale Factor: 0.9996
Latitude Of Origin: 0.0
Linear Unit: Meter (1.0)