GEOLOGICAL MAP OF EASTERN ELBA BETWEEN RIO MARINA AND TERRANERA (NORTHERN APENNINES, ITALY)

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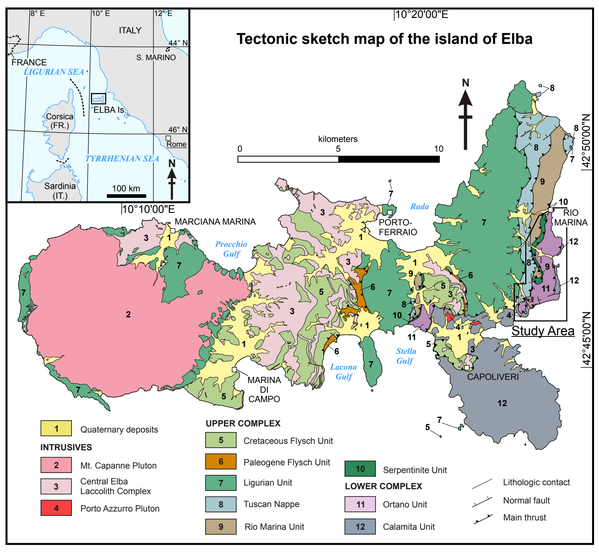
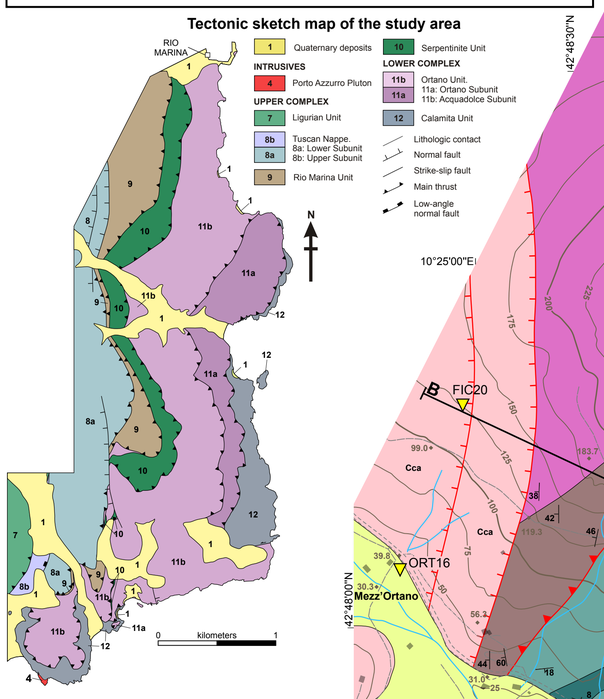




Stereographic Projections

Upper Tectonic Complex

a) Poles to foliation — n=82

b) Fold axes — n=33

Lower Tectonic Complex

c) Poles to foliation — n=670

d) Fold axes — n=100

All Units

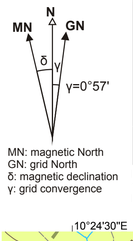
e) Poles to crenulations — n=54

f) Stretching lineations — n=188

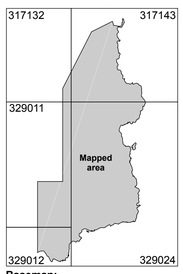
Stereographic projections: equal area, lower hemisphere
Contourline: 2%
Counting method: Fisher distribution

Topographic Basemap

Area with magnetic anomaly (irregular variation of magnetic declination)



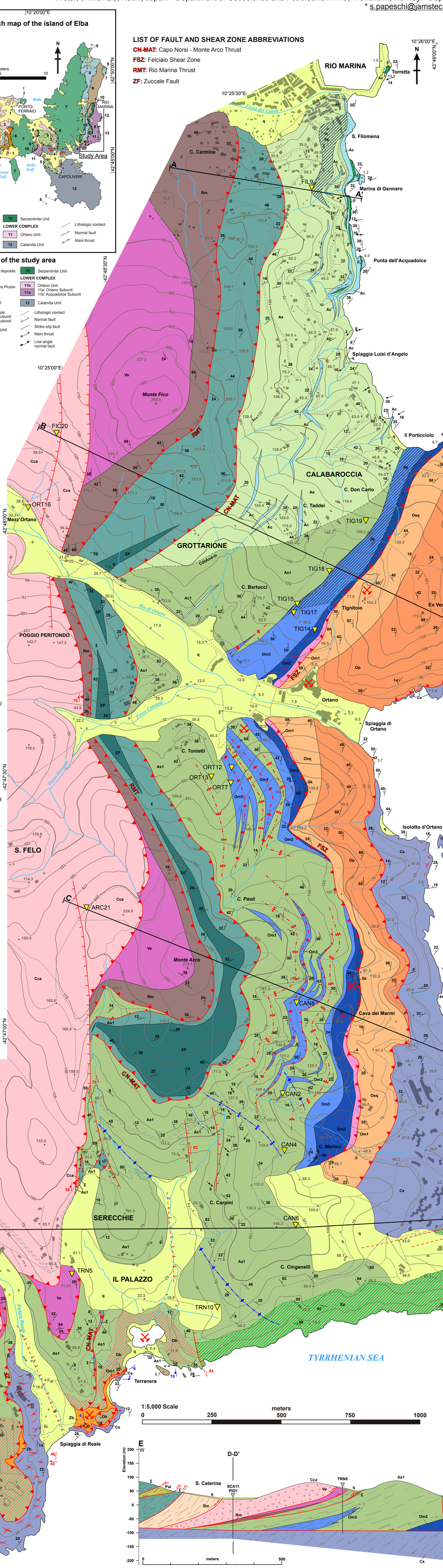
MN: magnetic North
GN: grid North
δ: magnetic declination
γ: grid convergence



Basemap:
1:5,000 CTR, Regione Toscana, 1987.
ED50; UTM Zone 32N

LIST OF FAULT AND SHEAR ZONE ABBREVIATIONS

CN-MAT: Capo Norsi - Monte Arco Thrust
FSZ: Felciaio Shear Zone
RMT: Rio Marina Thrust
ZF: Zuccale Fault



LEGEND

QUATERNARY DEPOSITS

Undifferentiated cover. Unconsolidated or poorly consolidated slope, alluvial plain, aeolian, beach, and anthropogenic deposits.
PLEISTOCENE - HOLOCENE

FAULT ROCKS

Zuccale Fault Breccia. Cataclasite, fault gouge, and mineralized fault rocks containing fragments and bodies of schist, marble, leucogranite, and serpentinite, derived from the footwall and the hanging wall.
UPPER MIOCENE - LOWER PLIOCENE

METASOMATIC ROCKS

Fe Skarn. Massive skarn bodies constituted by radiating aggregates of ilvaite-hedenbergite, pargasite, garnet, and epidote with accessory Fe-sulphides and oxides. Locally, they preserve schistose structures inherited from the protolith.
UPPER MIOCENE - LOWER PLIOCENE

Epidosite and chloritite. Bodies and layers of fractured epidote- and chlorite-rich schist, associated with chlorite-rich cataclasite and breccia, produced by metasomatism and tectonization of the Spotted Schists Formation.
UPPER MIOCENE - LOWER PLIOCENE

Iron ore body. Massive deposits of Fe-sulphides (pyrite, pyrrhotite, arsenopyrite), associated with bodies of oxides (hematite, magnetite) and hydroxides (limonite).
UPPER MIOCENE - LOWER PLIOCENE

INTRUSIVES (PORTO AZZURRO PLUTON)

Eastern Elba Dyke Complex. Leucogranite, aplite, and pegmatite bodies with primary K-feldspar, quartz, plagioclase, tourmaline ± muscovite ± biotite. Accessory andalusite and cordierite.
UPPER MIOCENE (MESSINIAN)

Monzogranite. Quartz-K-feldspar-plagioclase-tourmaline-biotite monzogranite with megacrystals of K-feldspar and mafic microgranular enclaves. Accessory apatite, zircon, magnetite, and cordierite.
UPPER MIOCENE (MESSINIAN)

UPPER TECTONIC COMPLEX

LIGURIAN UNIT

Argille a Palombini Formation. Dark grey graphitic shale and silty shale with layers of fine-grained calc-turbidite.
LOWER CRETACEOUS (HAUTERIVIAN – ALBIAN)

Serpentinite. Foliated serpentinite with bodies of serpentinized lherzolite and harzburgite preserving relic oceanic structures (**Serpentinized Peridotite - ΣP**).
MIDDLE - UPPER JURASSIC

TUSCAN NAPPE

Upper Subunit

Scaglia Toscana Formation. Varicolored slate with thin layers of turbiditic metasiltstone and metamarl.
UPPER CRETACEOUS (MAASTRICHTIAN) - EOCENE

Lower Subunit

Calcare Cavernoso Formation. Vacuolar limestone, massive dolomitic limestone and limestone, and tectonic breccia with clasts of carbonate, schist, and metasandstone.
UPPER TRIASSIC (NORIAN)

RIO MARINA UNIT

Verruca Formation. Violet phyllite, parallel and cross-bedded quartzite, and metasiltstone with amalgamated lenses of quartz-metaconglomerate.
MIDDLE - UPPER TRIASSIC (UPPER LADINIAN? – CARNIAN?)

Rio Marina Formation. Graphite-bearing phyllite, metasiltstone, metasandstone, and metaconglomerate lenses. Rare fossils of plants, crinoids, bivalves, and fusulinids.
CARBONIFEROUS (UPPER PENNSYLVANIAN) – PERMIAN (LOWER CISURALIAN)

LOWER TECTONIC COMPLEX

ORTANO UNIT

Acquadolce Subunit

HP-LT Complex - High-pressure greenschist-facies rocks with blueschist-facies relics.

Acquadolce Schist (As). Biotite-bearing phyllite, graphitic phyllite, and metasiltstone with layers of metasandstone and metamarl.

Acquadolce Calcschist (Ac). Lenses and bodies of calcschist, cherty marble, and marble, interlayered with glaucophane-epidote-albite-bearing metabasite, K-feldspar-plagioclase-bearing metavolcanite, and chlorite schist (**Metabasite - β**).
CRETACEOUS? – OLIGOCENE

LP-HT Complex - *Low-pressure amphibolite facies rocks of the Porto Azzurro Pluton contact aureole.*

Spotted Schists (As1). Biotite-micaschist with spots of sericitized cordierite and andalusite, containing layers of metasandstone, quartzite, and calcschist.

Contact-metamorphosed Calcschist (Ac1). Tremolite-diopside-bearing calcschist and cherty marble, interlayered with cordierite-andalusite-bearing micaschist
CRETACEOUS? – OLIGOCENE

Ortano Marble. Metacarbonate and impure metacarbonate, containing discontinuous bodies of grey to yellowish dolomitic marble at the base (**Dolomitic Marble - Om1**), passing upward to coarse-grained diopside-tremolite-bearing white marble (**Marble - Om2**), and capped by calcschist and cherty marble with lenses of cordierite-andalusite-biotite schist (**Cherty Marble - Om3**).
LOWER - MIDDLE JURASSIC? (HETTANGIAN? - BATHONIAN?)

Ortano Subunit

Ortano Schist and Quartzite. Cordierite-andalusite-biotite schist, graphitic schist, metasandstone, and quartzite with lenses of quartz-rich metaconglomerate.
UPPER ORDOVICIAN

Ortano Porphyroid. Metavolcanite, metarhyolite, and metavolcanoclastite with quartz-feldspar augens with quartz-feldspar augens surrounded by a quartz-sericite matrix.
MIDDLE ORDOVICIAN

CALAMITA UNIT

Calamita Schists. Andalusite-cordierite-biotite-K-feldspar micaschist, graphitic schist, and quartzite, with lenses of amphibole hornfels.
LOWER CARBONIFEROUS (MISSISSIPPIAN)

SYMBOLS

- Main foliation
- Crenulation cleavage
- Subsolidus foliation in magmatic rocks
- Cataclastic foliation
- Stretching lineation
- Subsolidus lineation in magmatic rocks
- Slickenline
- Fold axis
- Crenulation lineation/axis
- Strike and dip of thrust fault
- Strike and dip of normal fault
- Axial plane of syn-nappe stacking antiform
- Axial plane of syn-nappe stacking synform
- Axial plane of post-nappe stacking antiform
- Axial plane of post-nappe stacking synform
- Lithologic contact
- Cordierite ± andalusite-in isograd
- Main thrust fault
- Minor thrust fault
- Low-angle normal fault reactivated as thrust
- Normal fault (dashed when inferred/buried)
- Strike-slip fault (arrow indicates sense of shear)
- Geologic cross section
- Drilling site (grey when projected)
- Abandoned mine
- Abandoned quarry
- Contour lines (0 - 250 m; interval: 25 m)

Drill core log correlation chart (1:5,000 scale)