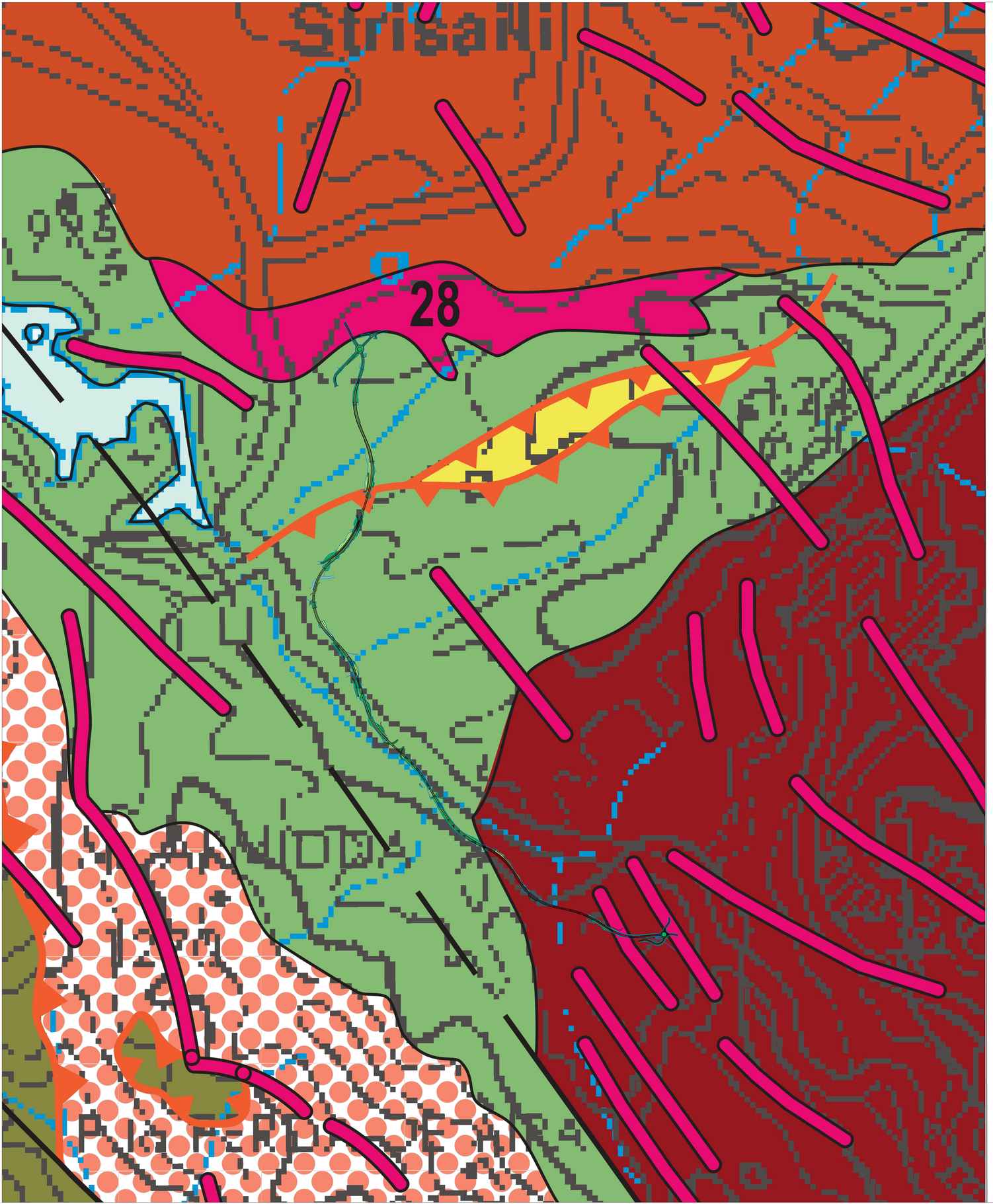

LEGEND

QUATERNARY DEPOSITS

1b — **1b: Deposits showing present-day evolution.** Recent alluvial gravel, sand and silt , marsh shales. *Holocene*
1a — **1a: Marine to continental Holocene deposits.** Alluvial, colluvial, eolian deposits; travertine, talus deposits, littoral gravel and sand. *Holocene*

2 — **Landslides.** Main ancient and recent landslides. *Pleistocene-Holocene*

2b, 3a — **3b: Ancient continental deposits.** Alluvial deposits, travertines and eolianites. *Pleistocene*
3a: Ancient marine deposits. Coastal to littoral conglomerates, sandstones and biocalcarenites ("Panchina timeniana"). *Pleistocene*

VOLCANIC AND SEDIMENTARY COVER

Pliocene-Pleistocene alkaline, transitional and subalkaline volcanic cycle (0.14-5.3 Ma)

Complex Related to the Opening of the Sardinia-Provençal and North Tyrrhenian Basins

4b — **4b: Alkaline basalts.** Alkaline to transitional basalts, basanites, trachybasalts and hawaites in large lava flows (Giare and Golei), locally bearing peridotite nodules,scoriaceous cones (Basalti delle Giare-Logudoro; Golfo di Orosei; Campeda; Marmilla; Ogliastra; Trexenta). *Pliocene-Lower Pleistocene*

4a — **4a: Trachytes and phonolites.** Lava domes, lava flows and rarely scoriaceous levels with trachytic, phonolitic-trachytic, phonolitic, thephritic-phonolitic and phonolitic- thephritic composition (Montiferro; Sarrabus: Capo Ferrato). *Pliocene-Lower Pleistocene*

5 — **Continental deposits.** Conglomerates, sands and shales of fluvio-lacustrine environment (N.ghe Casteddu Fm.-Montiferro; Campeda; Baronie: Orosei; Marmilla), eolian sandstones (Capo Marrubiu Fm.-Sinis). *Upper Pliocene-?Lower Pleistocene*

6 — **Monte Arci intermediate to acid volcanic rocks.** Lava domes and flows, with interlayered rare pyroclastic deposits, with rhyolitic to rhyodacitic composition, from aphyric to shallow porphyric texture, with obsidianacous and perlitic structure; glassy and vesicles-rich porphiritic dacites (Marmilla: M.te Arci). *Pliocene*

7 — **Pliocene marine deposits.** Coarse sandstones, bearing marine fossils (Fulie Fm.-Baronie: Orosei). Marine conglomerates, breccias and sands (N.ghe Baboe Fm.-Sinis). *Lower Pliocene*

Upper Miocene sedimentary succession

Complex Related to the Opening of the Algero-Provençal and North Tyrrhenian Basins

8 — **Marine deposits of the third Miocene sedimentary cycle.** Fenestrae-rich limestones and breccias of supratidal and interidal environment, with benthic foraminifers, echinoids, molluscs, balanides, algae (Torre del Sevo Fm.-Sinis); evaporitic, fine-grained limestones, sublittoral marls and bioclastic limestones, with foraminifers and molluscs (Calcari Laminati del Sinis; Capo S. Marco Fm.-Sinis). Mesinian Shelf limestones and marly sandstones, with foraminifers, molluscs, annelids (Sinis); limestones with hermatypic corals, molluscs, foraminifers and algae (Monte Santo Limestones-Logudoro: M.te Santo, M.te Pelao). *Tortonian-Messinian*

9 — **Continental deposits of the third Miocene sedimentary cycle.** Conglomerates with clayey matrix and sandstones of alluvial environment, illitic-caolinitic shales (Nurra). Torbonian-Lower Messinian Conglomerates and sands with caolinitic matrix of fluvio-marine environment (Sabbie di Florinas-Logudoro: Florinas, M.te Santo, Codrongianus); marly sandstones, siltstones often with carbonatic matrix, of sublittoral environment, with planktonic foraminifers, molluscs (Arenarie di Pirri-Campidano: Cagliari). *Serravallian-Messinian?*

Lower-Middle Miocene volcano-sedimentary succession

10 — **Upper lava flows of the second Miocene volcanic cycle.** Lava flows with rhyolitic to dacitic composition and peralkaline affinity (comendites), locally with well exposed rooy structures ("Comendit" fm. p.p.; Su Ruxu Marmu Group-Sulcis: Sant'Antioco Island and San Pietro Island); calk-alkaline lavas in neck and crypto-domes, with a andesitic to rhyodacitic composition ("andesiti terminali-α_3"-Logudoro: M.te Larenta, Mara; Anglona). *Upper Langhian-?Serravallian*

11b — **11b: Marine deposits of the second Miocene sedimentary cycle.** Epibathyal marls and marly sandstones, with planktonic foraminifers, pelagic molluscs, echinoids, corals (Marne di Borutta; Marne di Gesturi; Marmilla Fm. p.p.-Marmilla; Trexenta; Campidano; Logudoro; Sassarese; Gallura). *Upper Burdigalian-Middle-Upper Langhian*

11a — **11a: Littoral carbonatic deposits of the second Miocene sedimentary cycle.** Sands, carbonatic sandstones and calcarenites (Calcari di Mores-Logudoro: Ardara, Mores, Thiesi; Sassarese: Sassari, Sennori; Anglona: Sedini). *Upper Burdigalian*

12b — **12b: Continental deposits of the second Miocene sedimentary cycle.** Conglomerates and sands with clayey matrix and clasts from the Variscan basement and Tertiary volcanites (Oppia Nuova Fm.-Logudoro: Mores, Tula; Sulcis: Massimas, Sartacò); deltaic conglomerates and sandstones (Baronie: Orosei). *Upper Burdigalian-Langhian*

12a — **12a: Epiclastites of the second Miocene sedimentary cycle.** Continental deposits: pomiceous pyroclastic rocks, poorly welded, tuffs and ashes ("Lacustre" p.p.-Goceano; Logudoro: Mores; Anglona: Perfugas, Laerru). *Burdigalian*

13 — **Pyroclastic flows of the second Miocene volcanic cycle.** Pyroclastic flows in one or more flow units, with rhyolitic and dacitic composition, with vitrofric and brecciated levels ("trachiti superiori-τ_2"-Cala Lunga and Monte Sirai Groups; Logudoro; Iglesiente; Sulcis). *Upper Burdigalian-Langhian*

14 — **Dikes of the second Miocene volcanic cycle.** Dikes with basaltic composition (Arburese: M.te Arcuentu). *Upper Oligocene-Lower-Middle Miocene*

15b, 15a — **15b: Rhyolitic lavas of the second Miocene volcanic cycle.** Lava flows of rhyolitic-dacitic composition ("andesiti superiori-α_2" p.p.-Mejlogu: M.te Traessu, M.te Fruscu, Coasone; Planargia). *Burdigalian-Serravallian*
15a: Andesitic lavas of the second Miocene volcanic cycle. Lava flows and autoclastic breccias of andesitic composition ("andesiti superiori-α_2" p.p.;Carbonia group-Sulcis; Arburese: M.te Arcuentu; Valle del Temo: M.te Urturzu). *Burdigalian*

Upper Oligocene-Lower Miocene volcanic-sedimentary succession

Complex Related to the Opening of the Sardinia Trough

16b — **16b: Marine deposits of the first Oligo-Miocene sedimentary cycle.** Sandstones, conglomerates, tuffites, with planktonic foraminifers, benthic molluscs, corals, echinoids, etc. ("Arenarie di Gesturi"-Nuraliao Fm.; Marmilla Fm. p.p.-Sarcidano; Isili; Trexenta; Gesturi; Marmilla; Logudoro; Anglona; Castelsardo; Arburese: Funtanazza) ichthyolitic clayey marls, sandstones and siltstones with benthic molluscs ("Marne di Ales"-Marmilla; Arburese: Funtanazza). *Upper Oligocene-Lower Burdigalian*

16a — **16a: Littoral carbonatic deposits of the first Oligo-Miocene sedimentary cycle.** Hermatypic limestones and carbonatic sandstones, with interlayered rare silici-clastic sediments, with molluscs (Calcari di Villagrecca; Calcari di Isili"-Trexenta: Villagrecca; Sarcidano: Isili). *?Upper Oligocene-Lower Burdigalian*

17b — **17b: Lacustrine deposits of the first Oligo-Miocene sedimentary cycle.** Continental conglomerates and sandstones, with interlayered cherts, with plant remains ("Lacustre" p.p.-Barigadu: Lago Omodeo; Anglona); cherty limestones, siltstones, sandstones alternating with rhyolitic tuffs, with ostracods, plant remains, algae, molluscs ("Lacustre" p.p.-Logudoro: Oschiri, Berchidda; Anglona; Arburese: Funtanazza; Nurra: Porto Conte).

17a — **17a: Continental deposits of the first Oligo-Miocene sedimentary cycle.** Polygenic conglomerates and sandstones of fluvial environment (Ussana Fm.-Logudoro: Piano Ladu; Anglona; Castelsardo; Marmilla; Trexenta: Monastir, Nuraminis; Sarrabus: M.te Genis; Gerrei: S. Nicolò Gerrei; Sarcidano: Villanovatulo); continental poligenic conglomerates, carbonatic sandstones with reworked macro-foraminifers (Conglomerato di Cuccuru 'e Flores-Baronie: M.te Albo, La Caletta, M.te Tuttavista, Lanaitto). *?Oligocene-Aquitanian*

18 — **Pyroclastic flows of the first Oligo-Miocene volcanic cycle.** Pomiceous and lithic pyroclastic flows, weakly or strongly welded, with a rhyolitic-dacitic composition ("trachiti inferiori-τ_1"; Piroclastiti di Siliqua-Planargia; Goceano; Logudoro; Anglona; Valle del Cixerri). *Aquitanian-Burdigalian*

19c, 19b, 19a — **19c: Acid lavas of the first Oligo-Miocene volcanic cycle.** Lava flows of rhyolitic dacitic composition (Logudoro: M.te Pizzinnu di Romana). *Aquitanian-Burdigalian*
19b: Andesitic lavas of the first Oligo-Miocene volcanic cycle. Lava flows and rare hypoabyssal lava bodies, with alternating rare pyroclastic deposits, of andesitic composition (Serbariu di sopra group-Sulcis: Serbariu; Barigadu; Planargia; Campeda; Logudoro; Anglona). *Aquitanian*
19a: Hypoabyssal lava bodies of the first Oligo-Miocene volcanic cycle. Lavas in stocks and necks, of quartzo-andesitic-tonalitic-dacitic composition, with widespread hydrothermal alteration and related mineralization of Au and Cu (Complesso vulcanico di Siliqua; Andesiti di Monte Perda-Valle del Cixerri: M.te Silvana, Acquafredda, M.te Exi, P.ta de su Ferru; Sulcis: Sarroch; Nurra: Calabona). *Upper Oligocene*

Paleogene marine to transitional successions

Paleogene succession of Sulcis and Campidano

20b — **20b: Continental deposits.** Clayey reddish siltstones and sandstones, of continental environment, at the base locally ematitic conglomerates with clasts of the Variscan basement (Cixerri Fm.-Iglesiente; Sulcis; Campidano: Monastir). *?Middle-Upper Eocene-Oligocene*

20a — **20a: Paralic deposits.** Littoral to transitional limestones with characae, ostracods, macro-foraminifers ("Calcari a macroforaminiferi"; "Miliolitico"-Sulcis); marly limestones, marls, shale of continental and paralic environmental, with carbonaceous deposits, bearing characae, palinomorphs, carophytes, ostracods ("Lignitifero"-Sulcis; Cixerri). *?Paleocene-Middle Eocene*

Eocene succession of Eastern Sardinia

21b — **21b: Marine deposits.** Subtittoral limestones, marly limestones and clayey marls, with corals, echinoids, macro-foraminifers ("Calcari a nummuliti"; Monte Cardiga Fm. p.p.-Sarrabus; Gerrei: Salto di Quirra: M.te Cardiga; Baronie: Orosei). *Lower Eocene*

21a — **21a: Continental deposits.** Sandstones and polygenic ,more or less quartzitic, conglomerates of fluvio-deltaic environment, with oertides and oysters at the bottom of the "Calcari a nummuliti" (Monte Cardiga Fm. p.p.-Sarrabus; Gerrei: Salto di Quirra: M.te Cardiga). *?Upper Paleocene-Lower Eocene*

Mesozoic sedimentary successions

Upper Cretaceous marine successions

Autochtonous Volcano-sedimentary Cover of the South European Passive Margin

22b — **22b: Middle-Upper Cretaceous succession of Western Sardinia.** Carbonatic shelf deposits: limestones, marls and glauconitic calcarenites of sublittoral environment with benthic foraminifers, algae, rudists, locally lacustrine limestones with carophyta (Capo Caccia Fm.; Nurra; Anglona); in Nurra with a bauxite-rich layer at the base (Nurra: Olmedo). *Middle-Upper Cretaceous (Cenomanian-Campanian)*

22a — **22a: Middle-Upper Cretaceous succession of Eastern Sardinia.** Carbonatic shelf deposits: limestones and marls, cherty limestones, detritic glauconiphare sandstones, of circa-infralittoral environment, with planktonic foraminifers, rudists and inoceramids (Baronie: M.te Tuttavista, Lanaitto, Gorropu). *Middle-Upper Cretaceous (Upper Albian-Maastrichtian)*

Middle Triassic-Lower Cretaceous marine and transitional successions

23b — **23b: Lower Cretaceous succession of Western Sardinia.** Carbonatic shelf deposits: limestones, dolomitic limestones, oolitic limestones and bioclastic limestones of sublittoral environment (facies "Urgoniana"; Dragonara Fm.), with benthic foraminifers, algae, rudists, bryozoan, serpulidis; at the base: paralic marly limestones and marls (facies "Purbeckiana"), with charophytes and ostracods (Cala d'Inferno Fm.-Nurra; Sant'Antioco Island). *Lower Cretaceous (Berriasian-Lower Aptian)*

23a — **23a: Lower Cretaceous succession of Eastern Sardinia.** Carbonatic shelf deposits: bioclastic limestones and marly limestones, oolitic and cherty limestones ("Facies "Urgoniana"; Gorropu Fm.), with cephalopods, brachiopods ; at the base: paralic marly limestones and marls (facies "Purbeckiana"; Orudè Fm.), with charophytes and ostracods (Barbagia; Supramonte; Baronie: Lanaitto, Oroséi, M.te Albo). *Lower Cretaceous (Berriasian-Lower Albian)*

24c, 24b, 24a, 25 — **24c: Jurassic succession of Western Sardinia.** Carbonatic shelf deposits: dolostones and dolomitic limestones, bioclastic limestones, oolitihc and oncoid limestones, cherty limestones, mudstones, marly limestones and marls, with algae, crinoids, brachiopods, bivalves, cephalopods, coproliites (pollines, spores, ostracods; at the top: transition to the facies "Purbeckiana" with dolostones and lacustrine black dolomitic limestones (Nurra: Olmedo, M.te Doglia; Sulcis: Porto Pino). *Liassic-Malm*
24b: Upper Jurassic succession of Eastern Sardinia. Bioclastic limestones, oolitic cherty limestones and mudstones, of littoral-circalittoral environment, with algae, benthic foraminifers and nerineids (Monte Bardia Fm.; Tului Fm.: Supramonte; Baronie: M.te Albo, M.te Tuttavista). *Dogger - Malm*
24a: Middle-Upper Jurassic succession of Eastern Sardinia. Dolostones, sandy dolostones, dolomitic limestones of littoral to circalittoral environment, with benthic and planktonic foraminifers, calcisphaeras, calcareous algae, cephalopods, echinoderms (Dorgali Fm. - Baronie: M.te Albo; Supramonte: Sarcidano; Ogliastra); at the base: fluvial and deltaic conglomerates, quartz-sandstones, siltstones, mudstones, alternating lignitiferous layers with plants remains and sporomorphs ("Germa Selole Fm." - Baronie: Sarcidano; Supramonte; Ogliastra). *Middle-Upper Jurassic (Dogger-Malm)*
Triassic succession. Dolostones, marly dolostones, marls with gypsum and mudstones ("Keuper"), with palynomorphs, agglutinated foraminifers, gasteropods, brachiopods (Nurra: Ghiscera Mala, P.ta Dei Visti; Sulcis: Porto Pino). Carbonatic shelf deposits of circalittoral to transitional environment: dolomitic limestones and dolostones, sandy dolostones, limestones and marly limestones, with rare gypsum intercalations, with conodonts, cephalopods, bivalvias, brachiopods, crinoids, algae, sporomorphs, ichnofossils ("Muschelkalk"; P.ta Su Nuraxi Fm.-Nurra: Alghero, M.te S. Giusta; Iglesiente: Campumari; Arburese: Capo Pecora; Sarcidano: M.te Majore di Nuraci; Sulcis: Porto Pino). Red-violet silty mudstones, micaceous and quartz-rich sandstones and alluvial conglomerates, with silicified limestones intercalations in the Arburese and Iglesiente regions, with plants remains, sporomorphs and pollens ("Buntsandstein"; "Verrucano sardo", P.ta S'Ariadelli Fm.-Nurra: Cala Viola; Gerrei: Escalaplano; Arburese: Capo Pecora). *Middle-Upper Triassic*

Upper Carboniferous-?Lower Triassic continental succession

Complex Related to the Post-Variscan Cycle

26 — **Volcano-sedimentary succession.** Conglomerates, sandstones, with alternating epiclastic rocks, volcanic breccias, lacustrine limestones, with cherty levels and anthracite lenses, shales, with plants remains, sporomorphs and pollens, ostracods and amphibians (Riu su Luda Fm.-Barbagia: Seui, Seulo; Ogliastra: Perdiasdefogu; Gerrei: Lago di Mulargia); alluvial conglomerates, sandstones and siltstones, with plants (P.ta Lu Capiaroni Fm.-Nurra; P.ta Lu Capiaroni); sandstones, conglomerates, siltstones and fine laminated shales, with silicified limestones intercalations, locally with acidic lavas, tuffs and volcanic breccias, with sporomorphs and pollens, pteridophytes, ichnofossils, (Iglesiente: San Giorgio, Guardia Pisano; Arburese:Tuppa Niedda). *Westphalian D (?)-Autunian*

27b, 27a — **27b: Rhyolitic-dacitic volcanites.** Pyroclastic flows and lava flows of rhyolitic and rhyodacitic composition, subordinate dacitic lava flows (Gallura: P.ta Sálici; Baronie: Galtelli; Ogliastra: Perdasdefogu, M. Ferru near Tertenia; Gerrei: Escalaplano; Arburese: P.ta Acqua Durci); alkaline rhyolitic ignimbrites (Nurra: M. S. Giusta). *Upper Carboniferous-Upper Permian-?Lower Triassic*
27a: Andesitic volcanites. Lava flows, porphyritic subvolcanic bodies and breccias, with andesitic composition. *Upper Carboniferous-Upper Permian-?Lower Triassic*

VARISCAN BASEMENT

Upper Carboniferous-Triassic dike complex

Magmatic Complex Related to the Variscan Collision

28, 29, 30 — **28: Acid dikes.** Porphyritic-microgranite dikes, microgranite domes; pegmatites and aplites although widespread are not mappable at this map scale.
29: Basic dikes. Calkealcaline, transitional and alkaline basaltic dikes.
30: Hydrothermal dikes. Quartz-rich dikes and subvolcanic bodies, often mineralised with sulphides, barite, fluorite, gold and silver, etc. *Upper Carboniferous-Lower Triassic*

Upper Carboniferous- Permian plutonic complex

31 — **Leucogranites.** Generally equigranular granites, with microgranitic and porphiric facies (Gallura: Limbara; Sarrabus: Rio Picocca, San Vito; Sulcis: M.te Arcosu, Teulada); locally Grl-bearing leucogranites (Baronie: P.ta Tepilora). *Upper Carboniferous-Permian*

32 — **Monzogranites.** Equigranular to inequigranular monzogranites with KfS phenocrysts (Goceano: Budduso, Bortamelone; Gallura: Costa Paradiso) (Gallura: Calangianus, Arzachena; Barbagia: Olzai); rare Na-rich sienites (Sarrabus: Villasimius). *Upper Carboniferous-Permian*

33 — **Granodiorites.** Equigranular monzogranitic granodiorites (Gallura: S. Antonio; Barbagia: Gavoi) and inequigranular granodiorites (Gallura: Monti; Barbagia: Orosei); diesquigranular tonalitic granodiorites (Marghine: Bolotana; Barbagia: Mamoiada; Ogliastra: Villagrande; Goceano: Benetutti). *Upper Carboniferous-Permian*

34 — **Quarzodiorites and gabbros.** Granodioritic tonalites and gabbro-tonalites (Barbagia: Oniferi; Marghine: Burgos, Ottana; Mandrolisai: Ortueri); Gabbros and gabbro-tonalitic bodies (Gallura: P.ta Falcone, Bortigiadas; Goceano: Osidda; Sarrabus: Solanas). *Upper Carboniferous-Permian*

35 — **Peralluminous granites.** Crd-bearing granites (Nuoresei: Rio Isalle). *Upper Carboniferous-Permian*

36 — **Sin-kinematic granites.** Foliated granitoids, mostly tonalitic granodiorites and tonalites (Goceano: Pattada; Gallura: Bortigiadas, N.ghe Ola; Baronie: M.te Senes). *Upper Carboniferous-Permian*

37 — **Anatectic granitoids.** Anatectic leucogranites and granodiorites, strongly foliated (Gallura: Barrabisa, S. Maria Island, Golfoaranci; Anglona: Tarra Padedda; Mandrolisai: M.te Grighini). *Carboniferous*

Variscan migmatitic complex

38 — **Orthogneisses.** Granodioritic and monzogranitic orthogneisses (Asinara; Baronie: Tanauneila. Porto Ottiolu; Gallura: Valle del Liscia; Anglona: Tarra Padedda). *?Upper Ordovician*

39 — **Migmatites.** Diatexites and metatexsites with orthogneiss, locally with calc-silicates lenses (Gallura: Golfaranci, Palau; Anglona: Tarra Padedda; Baronie: Brunella, Straula; Asinara). *?Precambrian-?Lower Paleozoic*

40 — **Amphibolites.** Lenses of amphibolites and ultramafic amphibolites, with granulitic relics, derived from layered basic complexes (Gallura: Montigiu Nieddu, Tamuleo; Baronie: Brunella). *?Lower Paleozoic*

Firmato digitalmente da
Marco Rasimelli
CN = Rasimelli Marco
O = Ordine degli Ingegneri della Provincia di Perugia
C = IT

[illegible] complex with dominant amphibolite-facies assemblage

41 — **Amphibolites.** [illegible] relics of eclogite paragenesis (Gallura: P.te del Il Tulchi; Anglona: Giuncana). *Middle*

42 — **Gran** [illegible] ortic orthogneisses (Ortogneiss di Lode; Gneiss occhiadini" - Baronie). *Ordovician*

43 — **Paragn** [illegible] and quartzites of amphibolite-facies, medium pressure metamophism, widespread [illegible] Posada; Anglona; Giuncana).*?Paleozoic*

44 — [illegible] amphibolite-facies metamorphism, affected by a high-temperature metamorphic [illegible] *Paleozoic*

45 — [illegible] and [illegible] chists and paragneisses with Grt±oligoclase paragenesis (Baronie: Siniscola; Nurra: Stintino, Asinara) and Grt±Al2 paragenesis (Baronie: [illegible]). *?Paleozoic*

Greenschist and sub-greenschist facies variscan metamorphic complex

INTERNAL NAPPES
(Gennargentu, southern Nurra)

Upper Ordovician-Lower Carboniferous succession

46 — **Marbles.** Gray marbles, rare dolomitic marbles, with interlayered phyllites, locally fossiliferous, with crinoids, conodonts (Ogliastra: Arcu Correboi, Genna Sliana). *Devonian*

47 — **Metagabbros.** Alkaline metagabbroes (Nurra: Biancareddu, Canaglia, M.te Rugginosu). Upper Ordovician-*?Lower Silurian*

48 — **Ordovician-Silurian terrigenous successions.** Dark phyllites, locally carbonaceous, metasiltstones, black quartzites ("lidite") with alternating intercalated thin marble layers, and locally diamictite levels and ironstones (Nurra: Canaglia). *Upper Ordovician-Silurian*

Middle Ordovician volcano-sedimentary complex

49 — **Calcalkaline metavolcanites.** Basic to acid metavolcanites, metaepiclastites and metagraywackes (Nurra; Gennargentu). *Middle Ordovician*

Terrigenous successions of uncertain age

50 — **Bt-rich micaschists.** Bt-bearing metasandstones and phyllites (Barbagia: Orune; Nurra), of supposed Cambrian-Lower Ordovician age and locally of Devonian-Lower Carboniferous age. *Paleozoic*

51 — **Lower Paleozoic terrigenous succession.** Metasandstones quartzites and phyllites with alternating interlayered acid metavolcanic rocks ("Postgotlandiano" - Gennargentu; Barbagia: Seulo; Ogliastra; Goceano; Baronie; Nurra). *Lower Paleozoic*

EXTERNAL NAPPES
(Goceano, Sarcidano, Quirra, Gerrei, Sarrabus, Arburese, Iglesiente-Sulcis p.p.)

Upper Ordovician-Lower Carboniferous succession

Successions Involved in the Collisional Variscan Chain

52 — **Culm-like flysch deposits.** Metaconglomerates with clasts of "lydites", olistoliths and olistostromes of the Ordovician-Devonian succession; metasandstones, quartzites, phyllites and alkaline basic metavolcanites (Pala Manna Fm.-Sarrabus: Pala Manna; Trexenta: Mandas; Gerrei: Ballao, Armungia; Silius). *Lower Carboniferous*

53 — **Devonian carbonatic succession.** Metalimestones, locally nodular, with crinoids, ammonites ("Calcari a Clymenie"; Calcari di Villasalto - Sarrabus: M.te Lora; Gerrei: Villasalto, M.te Tacco); in the lowermost tectonic units: marbles, dolomitic marbles and calcschists, with crinoids (Sarcidano: Asuni; Sarrabus: Rio Gruppa; Salto di Quirra: Castello di Quirra; Trexenta: Mandas; Goceano: Illorai, Silanus; Ozieri). *Middle Devonian - Lower Carboniferous*

54 — **Black shales with graptolites and tentaculites.** Dark, carbonaceous metapelites with graptolites ("Scisti neri a graptoliti" - Gerrei: Goni; Sarrabus: Baccu Scottis), at the base black cherts ("lydites"); **54a:** lenses of nodular metalimestones, with orthoceratids, crinoids, pelagic tentaculites and conodonts ("Calcari ad Orthoceras"; "Odekalk"-Gerrei: Goni, Armungia; Sarrabus: Baccu Scottis, M.te Lora). Silurian
Thin levels of metalimestones and metasiltstones with tentaculites ("Scisti a tentaculiti" - Trexenta: Mandas; Sarrabus: Ballao). *Upper Silurian-Lower Devonian*

55 — **Upper Ordovician terrigenous succession.** Metaconglomerates, metarkoses, metasiltstones, metagraywackes, with bryozoans, brachiopods, trilobites, gasteropods, locally in the upper part: diamictites (P.ta Serpeddì Fm.; Ormeledu Fm.; Rio Canonì Shales-Sarrabus: Brecca, P.ta Serpeddì; Gerrei: Rio Canonì; Barbagia: Bruncu Nieddu, Ormeledu); metacalcareniites and metalimestones often silicified (Br. Su Pitzu Fm.; "Quarziti del Sarrabus"; Tuvixei Fm.); in the upper part: alkaline metabasalts (Sarrabus: Bruncu Nieddu close Brecca; Gerrei: Silius, San Basilio). *Upper Ordovician (Katian-Hirnantian)*

Middle Ordovician magmatic and volcano-sedimentary complex

56b — **56b: Acid metavolcanites.** Calkalkaline metapyroclastites with rhyolitic-dacitic composition, porphiric texture with mm-cm sized Qtz Kfs phenocrysts ("Porfidi grigi del Sarrabus"; Porfiroidi-Sarrabus: Brecca, Muravera, Baccu Locci; Gerrei: Silius, Goni); locally at the base: alternating quartzite, metasandstones and polygenic metaconglomerates with clast of intermediate-basic metavolcanites (Su Muzzioni Fm.-Sarrabus: Brecca, Baccu Locci; Gerrei: Mulargia Lake). *?Middle Ordovician*

56a — **56a: Intermediate to basic metavolcanites.** Calkalkaline metavolcanites, metaepiclastites and metagraywackes with intermediate and rarely basic composition ("Serra Tonnai Fm."-Sarcidano: M.te S. Vittoria, Mulargia Lake; Sarrabus: Brecca, Riu Gruppa); metaconglomerates with prevaling clasts of acid volcanic rocks ("Manixeddu Fm."-Sarcidano: M.te S. Vittoria, Mulargia Lake; Sarrabus: Riu Gruppa); rhyolitic metavolcanites, metatuffites and metaepiclastites ("Monte Corte Cerboi Fm.", "Porfidi bianchi"-Sarcidano: M.te S. Vittoria; Sarrabus: Muravera). At the base lenses of polygenic coarse metaconglomerates ("Conglomerato di Rio Ceraxa"; Metaconglomerato di Muravera-Sarrabus: Muravera, Brecca, Baccu Locci; Salto di Quirra: M.te Olisastedu). *?Middle Ordovician*

57 — **Metadolerites.** Dikes and subvolcanic bodies of dark porphyric mafic rocks, with basic composition, with phenocrysts of calcic amphibole and plagioclase, doleritic texture. Isolated, intruded in the Arburese-Iglesiente: M.te Linas, M.te Corrò; Gerrei: Sarcidano: M.te S. Vittoria; Trexenta: Mandas). *?Middle-Upper Ordovician*

Pre-Middle Ordovician succession

58 — **Cambro-ordovician terigenous succession.** Micaceous metasandstones and quartzites, interbedded with metapelites and rare quartzitic metaconglomerates and marbles in the upper part, with sedimentary structures, ichnofossils, trilobites, jellyfish prints, and acritarchs ("Solanas Fm."; Arenarie di San Vito-Sarrabus: Rio Olìastu, Br. Laccoi, Riu Ceraxa, S. Vito; Sarcidano: Laconi, Villanovatulo; Gerrei: Br. Maressusu; Salto di Quirra: Rio S. Giorgio; Arburese). *Middle Cambrian-Lower Ordovician*

EXTERNAL FOLD AND THRUST BELT
(Iglesiente, Sulcis)

Middle Ordovician-Lower Carboniferous succession

59 — **Culm-like flyschoid deposits.** Alternating quartzites, metasandstones, metapelites, metaconglomerates, metabreccias and metaconglomerates; olistoliths, olistostromes with large clasts of the Silurian-Devonian sedimentary sequence ("Culm") (Pala Manna Fm.-Sulcis: Rio Lilloni, Pula mountain). *Lower Carboniferous*

60 — **Devonian carbonatic succession.** Nodular metalimestones with conodonts and pelagic tentaculites (Mason Porcus Fm.-Sulcis: M.te Padentieddu; Iglesiente: Su Nuargi, Mason Porcus, Perda S'Altari). Middle Devonian

61 — **Black shales with graptolites.** Graphitic black shales, with graptolites and black cherts at the bottom ("lydites") ("Scisti neri a Graptoliti"; Genna Muxeru Fm.-Iglesiente: Fluminimaggiore, M.te Linas, M.te Cortoghiana Becciu, Genna Quadrosu; Sulcis: Tagliaferro). *Lower Silurian*

62b — **62b: Upper Ordovician terrigenous succession.** Metasiltstones and metasandstones with rare interbedded basic metavolcanites, with bryozoans, brachiopods, tentaculites, graptolites, crinoids, trilobites (Monte Orri Fm.; Domusnovas Fm.; Rio San Marco Fm.-Iglesiente: Rio San Marco; Sulcis: Baccu Abis, M.te Orri). *Upper Ordovician (Katian-Hirnantian)*

62a — **62a: "Ordovician Puddings".** Metaconglomerates with olistoliths and clasts of Cambrian limestones and dolostone, alluvial and coastal violet-reddish slates and metasandstones ("Puddings"; Monte Argentu Fm.-Iglesiente: Portixeddu, Buggerru, Fluminimaggiore, P.ta S'Argiola, P.ta Su Amadori, Mason Porcus, Rio Carnamenda, Caput Aquas; Sulcis: Narcao, Rosas). *Middle-Upper Ordovician*

Middle Ordovician magmatic complex

63 — **Capo Spartivento Orthogneisses.** Coarse-grained granodioritic orthogneisses, with Qtz and Kfs phenocrysts. *?Middle-Upper Ordovician*

Pre-Middle Ordovician succession

64 — **Cabitza Formation.** Shales, metasandstones, and metasiltstones with rare carbonatic lenses ("Scisti di Cabitza"; Cabitza Fm.) at the base nodular metalimestones ("Metallifero p.p."; "Calceschisti"; Campo Pisano Fm.), with trilobites, benthic graptolites, benthic foraminifers, sponges, carpoids, Hyolithida, brachiopods (Iglesiente: Cabitza, M.te S. Giovanni, Nebida, Campo Pisano, Gonnesa, Villamassargia). Lower Cambrian-Lower Ordovician

65 — **Gonnesa Formation.** Metalimestones and dolostones, with rare archaeocyats, trilobites, echinoderms ("Metallifero" p.p.; "Calcare ceroide"; "Dolomia grigia"; San Giovanni Fm.-Iglesiente: Is Oliastus, Acquacadda, S. Giovanni); stromatolitic metadolostones and metalimestones, with rare archaeocyats ("Dolomia rigata"; Santa Barbara Fm.-Iglesiente: Planu Sartu, Arcu Biasterria, S. Barbara). Lower Cambrian

66b — **Nebida Formation ("Arenarie Fm."). 66b: Punta Manna Mb.** Metasandstones with carbonatic cement, metadolostones, oolitic metalimestones, micritic metalimestones, with trilobites, archaeocyats, algae, brachiopods, lingulids, rare Hyolithida and echinoderms. *Lower Cambrian*

66a — **66a: Matoppa Mb.** Metasandstones and silty metasandstones with rare metalimestone intercalations, with algae, archaeocyats. Lower Cambrian

67 — **M. Settiballas schists.** And-bearing micaschists (Sulcis: Chia). *?Precambrian*

Symbols

- Quaternary volcanic eruptive center

Cenozoic Tectonics
- Fault
- Buried Fault
- Normal Fault
- Transcurrent Fault
- Reverse Fault, Thrust

Variscan Tectonics
- Fault, tectonic contact
- Main Thrust
- Transcurrent Fault
- Minor Thrust

anas GRUPPO FS ITALIANE

ANAS S.p.A.
Direzione Progettazione e Realizzazione Lavori

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LOTTO BIVIO VILLAGRANDE - SVINCOLO DI ARZANA
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PROGETTO DEFINITIVO — COD. CA22

PROGETTAZIONE: ANAS - DIREZIONE PROGETTAZIONE E REALIZZAZIONE LAVORI

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PINI SWISS ENGINEERS Srl — MANDANTE

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IL GEOLOGO
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