GEOMORPHOLOGICAL MAPPING OF NEAR-SURFACE DEPOSITS: HILLSLOPE EVOLUTION OF THE ADRIATIC PIEDMONT OF THE CENTRAL APENNINES (FELTRINO STREAM BASIN AND MINOR COASTAL BASINS, ABRUZZO, ITALY)

SCALE 1:20.000

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LITHOLOGICAL MAP OF ABRUZZO

Geomorphological features

Structural landforms
- Mesa and plateaux top surface
- Structural scarp *(Dashed when deeply weathered)*
- Asymmetric ridge
- Saddle

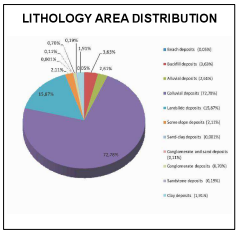
Slope gravity landforms
- Reverse slope in the landslide, Quiescent
- Reverse slope in the landslide, Inactive
- Small landslide (not in scale)
- Rock fall and topple scarp, Active
- Complex landslide scarp, Active
- Complex landslide scarp, Inactive
- Rotational slide scarp, Active
- Rotational slide scarp, Quiescent
- Rotational slide scarp, Inactive
- Trench, Active
- Trench, Inactive
- Earthflow landslide, Active
- Earthflow landslide, Quiescent
- Rock fall and topple landslide, Active
- Rock fall and topple landslide, Inactive
- Lateral spread landslide, Active
- Complex landslide, Active
- Complex landslide, Quiescent
- Complex landslide, Inactive
- Rotation slide landslide, Active
- Rotation slide landslide, Quiescent
- Rotation slide landslide, Inactive
- Soil creep, Active

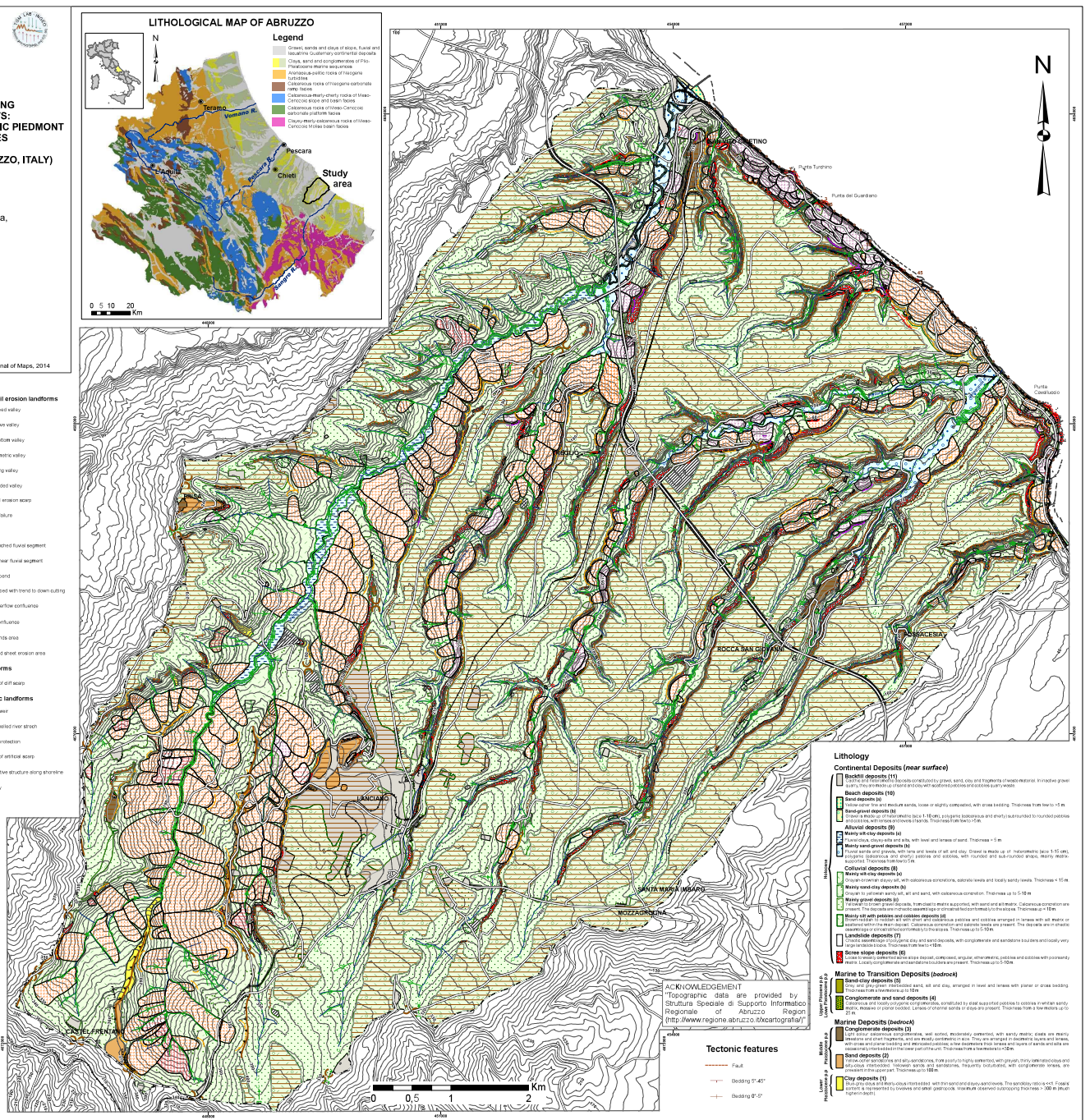
Fluvial and soil erosion landforms
- V shaped valley
- Concave valley
- Flat bottom valley
- Asymmetric valley
- Hanging valley
- Beheaded valley
- Fluvial erosion scarp
- Bank failure
- Gully
- Entrenched fluvial segment
- Rectilinear fluvial segment
- River bend
- River bed with trend to down cutting
- Counterflow confluence
- 90° confluence
- Badlands area
- Rill and sheet erosion area

Coastal landforms
- Edge of cliff scarp

Anthropogenic landforms
- River weir
- Channelled river stretch
- Bank protection
- Edge of artificial scarp
- Protective structure along shoreline
- Quarry

LITHOLOGY AREA DISTRIBUTION





Lithology

Continental Deposits *(near surface)*

- **Backfill deposits (11)** — Light to dark brown anthropogenic deposits constituted by gravel, sand, clay and fragments of waste material. In inactive gravel quarry they are interbedded inland and clay with scattered pebbles and cobbles quarry waste.
- **Beach deposits (10)**
  - **Sand deposits (a)** — Yellow-ochre fine and medium sands, loose or slightly compacted, with cross bedding. Thickness from few to >5 m.
  - **Sand-gravel deposits (b)** — Gravel is made up of heterometric (acic 1-10 cm), polygenic (calcareous and cherty) sub-rounded to rounded pebbles and cobbles, with lenses and levees of sands. Thickness from few to >5 m.
- **Alluvial deposits (9)**
  - **Marshy silt-clay deposits (a)** — Fluvial clays, clayey-silts and silts, with level and lenses of sand. Thickness < 5 m
  - **Mainly sand-gravel deposits (b)** — Fluvial sands and gravels, with lens and levels of silt and clay. Gravel is made up of heterometric (acic 1-15 cm), polygenic (calcareous and cherty) pebbles and cobbles, with rounded and sub-rounded shape, mainly matrix-supported. Thickness from few to 10 m.
- **Colluvial deposits (8)**
  - **Marshy silt-clay deposits (s)** — Grayish-brownish clayey silt, with calcareous concretions, calcrete levels and locally sandy levels. Thickness < 15 m.
  - **Marshy sand-clay deposits (b)** — Grayish to yellowish sandy silt, silt and sand, with calcareous concretion. Thickness up to 5-10 m
  - **Marshy gravel deposits (g)** — Yellowish to brown gravel deposits, from clast to matrix supported, with sand and silt matrix. Calcareous concretion are present. The deposits are inchaotic assemblage or crossstratified and interfingering to the slopes. Thickness up < 10 m.
  - **Mainly silt with pebbles and cobbles deposits (d)** — Brown-reddish to reddish silt with chert and calcareous pebbles and cobbles arranged in lenses with silt matrix or scattered within the main deposit. Calcareous concretion and calcrete levels are present. The deposits are in chaotic assemblage or crossstratified and interfingering to the slopes. Thickness up to 5-10 m.
- **Landslide deposits (7)** — Chaotic heterometric (cm) polygenic clay and sand deposits, with conglomeratic and sandstone boulders and locally very large landslide blocks. Thickness from few to >10 m.
- **Scree slope deposits (6)** — Loose to weakly cemented scree slope deposit, composed, angular, etherometric, pebbles and cobbles with prominently matrix. Locally conglomeratic and sandstone boulders are present. Thickness up to 5-10 m.

Marine to Transition Deposits *(bedrock)*

- **Sand-clay deposits (3)** — Grey and gray-green interbedded sand, silt and clay, arranged in level and lenses with planar or cross bedding. Thickness from a few meters up to 10 m
- **Conglomerate and sand deposits (4)** — Calcareous and locally polygenic conglomerates, constituted by clast supported pebbles to cobbles in whitish sandy matrix, massive or planar bedded. Lenses of channel sands or clays are present. Thickness from a few meters up to 20 m.

Marine Deposits *(bedrock)*

- **Conglomerate deposits (3)** — Light yellow calcareous conglomerates, well sorted, moderately cemented, with sandy matrix; clasts are mainly limestone and chert fragments, and are mostly centimetric in size. They are arranged in decametric layers and lenses, with a general tabular geometry. Locally they are stratified poleleies; a few decimeters thick lenses and layers of sands and silts are occasionally interbedded in the lower part of the unit. Thickness from a few meters to >30 m.
- **Sand deposits (2)** — Yellow-ochre sandstone and silty-sandstones, from poorly to highly cemented, with grayish, thinly laminated clays and silty-clays interbedded. Yellowish sands and sandstones, frequently bioturbated, with conglomeratic lenses, are prevalent in the upper part. Thickness up to 100 m.
- **Clay deposits (1)** — Blue-grey clays and silty-clays intercalated with thin sand and clayey-sand levels. The sandstay ratio is <<1. Fossil content is represented by bivalves and small gastropods. Maximum observed outcropping thickness > 300 m (much higher in depth)

ACKNOWLEDGEMENT
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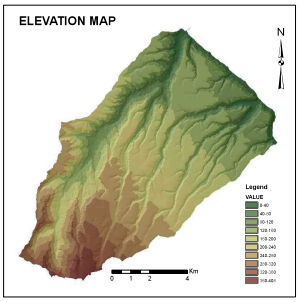
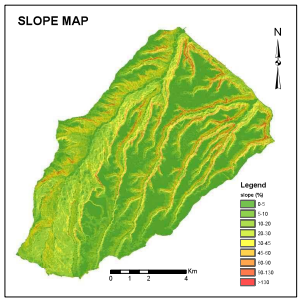
Tectonic features

- Fault
- Bedding 5°-45°
- Bedding 0°-5°

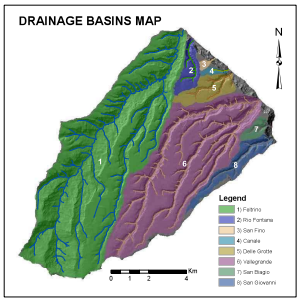
ELEVATION MAP



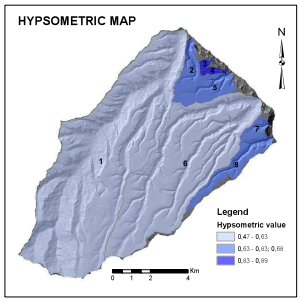
SLOPE MAP



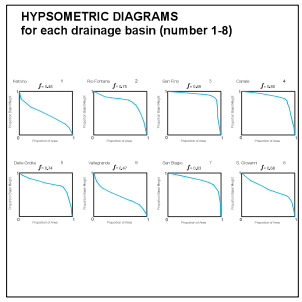
DRAINAGE BASINS MAP



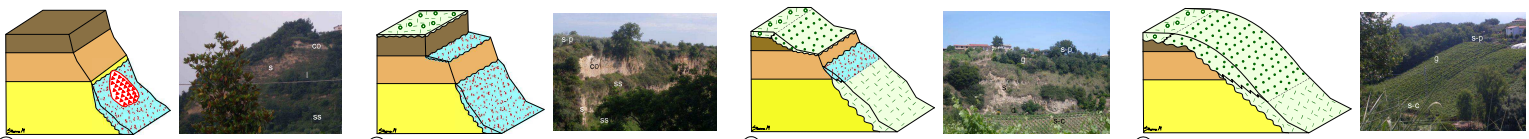
HYPSOMETRIC MAP



HYPSOMETRIC DIAGRAMS for each drainage basin (number 1-8)



BLOCK DIAGRAMS OF HILLSLOPE EVOLUTION



1. Hillslopes show a steep and sharp profile. Landslides (i.e. rockfalls and topples, but also rotational and complex) affect sharp structural scarp edges on hard rocks (conglomerate or sandstone with conglomerate lenses) at hillslopes' top. Slope and rockfall deposits cover the hillslopes' base.
2. Progressive hillslope weathering define multiple, step-like vertical and sub-vertical scarps, due to the control of alternating sandstone and conglomerate bedrock deposits. The scarps are bounded at the base by moderately steep and undulated slopes. Here, former slope deposits are eroded and reworked by surface runoff or sheet erosion. Slope deposits cover the base of the whole slopes and of single scarps, while new colluvial deposition begin at the top of the slopes.
3. Hillslopes show an irregular profile with small discontinuous scarps; former scarps are eroded and weathered. Colluvial deposits progressively cover the upper part of the slopes and the former scarps; they also begin to affect the base of the slope due to erosion and reworking of slope deposits by surface runoff or sheet erosion; new slope deposits are present along the scarp remnants.
4. Hillslopes show, finally, a smooth convex-concave profile which characterises the deeply weathered structural scarps. Colluvial deposits progressively cover the upper part of the slopes and new deposits develop now along the middle and lower part of the slopes blanketing the bedrock deposits.

Legend

Continental deposits
- Colluvial deposits: Mainly silt with pebbles and cobbles deposits (s-p)
- Colluvial deposits: Mainly gravel deposits (g)
- Colluvial deposits: Mainly silt-clays deposits (s-c)
- Landslide deposits (l)
- Scree slope deposits (ss)

Marine deposits
- Conglomerate deposits (co)
- Sand deposits (s)
- Clay deposits (cl)