Plate 1

GEOLOGICAL MAP OF THE ISLAND OF STROMBOLI, ITALY*

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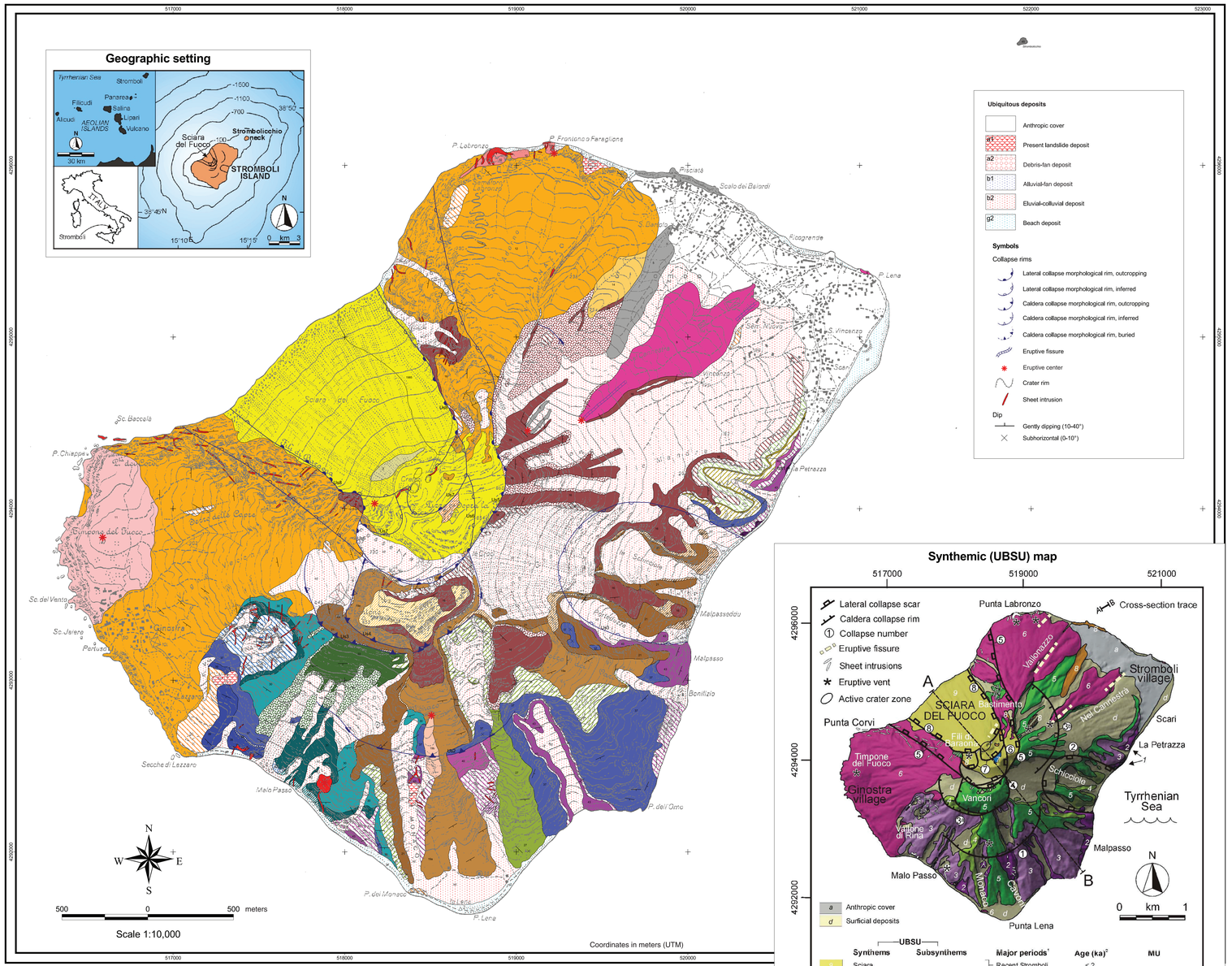
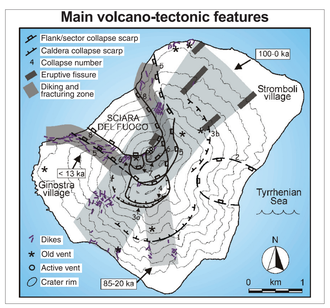
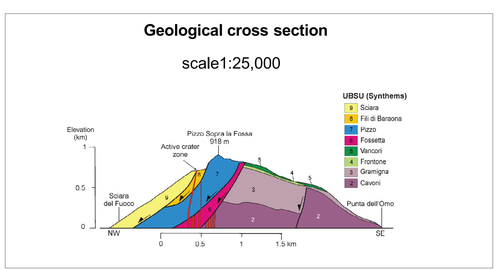
*This map portrays the rock distribution as in year 2001



UBSU – unconformity-bounded stratigraphic units; MU – main unconformities, the numbers in circles are the same as reported in the map; LC – lateral collapse; CC – caldera collapse; AU – angular unconformity; 1 – major periods after Keller et al. (1993); 2 – ages from Condomines and Allegre (1980) and Gilot and Keller (1993).





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AEOLIAN VOLCANIC DISTRICT - STROMBOLI ISLAND

Lithosomatic units	UBSU: Synthems	UBSU: Subsynthems	Lithostratigraphic units	Stratigraphic range	Age (yr)	Unconformity surfaces
Sciara del Fuoco	Sciara		volcanic deposits / sedimentary deposits 1 lavas F: Present products of the summit craters, made of lapilli, bombs, dungs and subordinate dark gray-black vesiculated lava flows (shoshonitic basalts). The boundary of the 1985 lava flow is shown. 2 lavas E: Sequence of large welded scorias with a rough metric bedding.			Us8: sliding surface of the NW flank of the edifice built up in the amphitheater of the previous Sd7 collapse, with the formation of the present Sciara del Fuoco depression; elsewhere, erosional surface.
Bartolo	Fili di Baraona		3 Subsciara lavas: Poorly vesiculated lava flows, locally intensely fumarolized and fractured, each 0.5-2-m thick, interbedded with decimetric horizons of autoclastic breccias. Dip directions different from those of the present volcano geometry. 4 La Fossetta pyroclastic deposits: Reddish pyroclastic deposits, mainly tuffs and lapillistones with parallel millimetric laminations, and lapilli tuffs without internal structures (surge and flow deposits). 5 San Bartolo lavas: Vesiculated porphyritic lavas, black in color with evident flow structures, emitted from a short fissure located at 650 m a.s.l. (high-K basaltic andesites). 6 breccias D: Epiclastic deposit made of etherometric blocks, from angular to subrounded, in a medium-fine breccia to sandy matrix, interpreted as a landslide deposit.		1350 ± 60[4] 2000[4]	Us7: sliding surface of the NW flank of the Pizzo cone, with the formation of an amphitheater opened in the same direction; elsewhere, erosional surface.
Pizzo	Pizzo		7 Pizzo Sopra la Fossa pyroclastic deposits: Well-stratified pyroclastic breccias, mostly constituted of lapillistones and tuffs, from yellow-ocher to pale brown in color with a few minor discontinuities within the sequence; intense fumarolic alteration. Fall deposits (shoshonitic basalts).			Us6: sliding surface of the northwestward sector collapse of the large Fossetta synthem edifice; elsewhere, erosional surface.
Cannestrà Timpone	Fossetta		8 Lazzaro pyroclastic deposits: Laminated tuffs with horizons of accretionary lapilli (surge), breccia tuffs (flows) and matrix-supported breccias with chaotic texture (lahar), dominantly yellow-ocher in color (leucite-bearing shoshonites). 9 Nel Cannestrà lavas: Scoriaceous lava flow deposits, some highly vesiculated and foamy, with presence of welded spatters issued from an eruptive fracture striking NE-SW close to Nel Cannestrà (leucite-bearing shoshonites, KS). 10 Punta Labronzo lavas: This unit is partly made of massive lava flows, light gray in color and with holocrystalline texture, locally less compact, and partly of shallow intrusions and eruptive dikes (leucite-bearing shoshonites, KS). 11 Timpone del Fuoco lavas: Lava flows identical to those of Vigna Vecchia, emplaced from the secondary eruptive center of the Timpone del Fuoco (leucite-bearing shoshonites, KS). 12 Vigna Vecchia lavas: Porphyritic lava flows, pale gray in color, phenocrysts of dominant plagioclase, pyroxene, and olivine; 0.5-1-m thick, alternated with autoclastic breccias 2-6 m thick; widespread flow lineations and ogives. At Vallonazzo, pyroclastic breccia with fiamme (leucite-bearing shoshonites, KS). 12 breccias C: Massive epiclastic deposit, with etherometric blocks in a fine-grained matrix, interpreted as a landslide deposit.		5,600 ± 3,300 (K/Ar)[3] 13,800 ± 1,900 (K/Ar)[3]	Us5: northwestward sector collapse surface of the large cone corresponding to the Vancori synthem; elsewhere, erosional surface.
	Vancori	Liscione	14 Roisa breccias: Scoriaceous lavas with welded agglomerates of scoria and bombs, locally flattened. The size of the scorias suggests a proximal facies (shoshonitic basalts). 15 breccia B: Pyroclastic breccia, gray-ocher in color, roughly stratified, juvenile welded products in black layers, laminated tuffs. Explosion breccia and surge deposits (latites to leucite-bearing shoshonites). 16 lavas D: Porphyritic lava flows, pale gray in color, orange on alteration surface, 2-3 m thick, with autoclastic flows 1-m thick; plagioclase phenocrysts up to 0.5 cm in size (latites and trachytes, SHO series). 17 breccias A: Epiclastic breccias with angular lava lithics (lithologically similar to the Middle Vancori lavas), cm-dm in size, in a scarce debris matrix, coarse sorting and reverse grading. 18 pyroclastic deposits C: Yellow breccia tuffs with black fiamme, reddish lapillistones, lapilli tuffs and grayish laminated tuffs. Flow, fall, and surge deposits.		13,000 ± 1,900 (K/Ar)[3]	
		Vari	19a lavas C: a - Porphyritic lava flows, dark gray in color, scoriaceous and vesiculated, 0.5-2 m thick, with prevailing plagioclase phenocrysts, interlayered with thick autoclastic breccias. Reddish alteration and widespread surface-flow lineations (shoshonites). 19b b - Serro Monaco lavas: lavas erupted from a secondary center; plug and reddish spatters. 20 pyroclastic deposits B: Breccia tuff, yellow in color with dark gray scorias and black flattened pumices. Lapillistones and laminated tuffs. Flow, fall, and surge deposits.		21,000 ± 6,600 (K/Ar)[3]	Us4: Unconformity due to the summit caldera collapse of the Frontone synthem cone; erosional surface in the surrounding areas.
	Frontone		21 lavas B: Thick porphyritic lava flows, gray in color with prevailing pyroxene phenocrysts (shoshonites). 22 pyroclastic deposits A: Lapilli tuffs, yellow-ocher in color, with welded scorias and dark-gray flattened pumices. Pyrodastic-flow deposits.		26,200 ± 3,200 (K/Ar)[3]	Us3: Composite unconformity surface, related to the summit caldera collapse of the Gramigna synthem cone, an erosional surface and a lateral collapse of the SE flank.
	Gramigna	Pizzillo	23 Scari pyroclastic deposits C: Dark gray-black well-sorted lapillistones, interlayered with lapilli tuffs and brown tuffs, coarse breccia with cauliflower bombs and impact blocks; fall, flow, surge and explosion-breccia deposits (shoshonites). 24 Scari lava B: Single porphyritic lava flow, dark gray in color, rich in phenocrysts of plagioclase and pyroxene. Central massive part 0.5-1 m thick; above and below, corresponding autoclastic breccias for a total thickness of 3-4 m. Marker level (shoshonites). 25 Scari pyroclastic deposits A: Well-sorted dark gray-black lapillistones, 0.1-3-m thick, with rare bombs and blocks, separated by lapilli tuff and beige-brown tuff levels, 10-50-cm thick. Fall, flow, and surge deposits (high-K basalts, shoshonites).		34,600 ± 3,000 (K/Ar)[3]	
		Aghiastro	26 Guardiani pyroclastic deposits: Pyroclastic breccias and brown-reddish lapillistones, lapilli tuffs, and ocher laminated tuffs. Fall, flow, and surge deposits, locally interbedded with lahars (basaltic andesites transitional between HKCA and SHO series). 27 Serro Barabba lavas: Thin porphyritic lava flows, intelayered with autoclastic breccias; brown-red alteration surfaces and widespread flow lineations. 28 Cugno Aghiastro lavas B: Porphyritic lava flows, 2-3-m thick, with phenocrysts of plagioclase, and autoclastic breccias (high-K andesites transitional to latites, SHO series). 29 Cugno Aghiastro breccias A: Epiclastic breccias formed by lava clasts, cm-dm in size, lapilli and scorias with a scarce debris matrix and reversely graded structure. Grain flow. 30 Vallone di Rina lavas F: Porphyritic lava flows, gray in color, composed by thin lava beds interlayered with thick beds of autoclastic breccias, with phenocrysts of plagioclase, pyroxene, and olivine up to 2-3 mm in size (high-K basalts and high-K basaltic andesites). 31 Vallone di Rina lavas E: Porphyritic lava flows, pale gray in color, 2-3-m thick, with autoclastic breccias. Peculiar is the presence of phenocrysts of biotite, pyroxenes, and dark-gray lava enclaves (biotite andesites of the HKCA series and high-K basalts). 32 Malo Passo breccias B: Epiclastic breccias, composed of an alternation of horizons with different degree of sorting, poorly cemented, with etherometric lithic blocks (cm to dm in size) and absence of pumices or scorias. 33 Malo Passo pyroclastic deposits A: Lapillistones, lapilli tuffs (fall and flow deposits) and matrix-supported breccias with chaotic structure, gray-yellow in color (lahars).		35,000 ± 6,000 (K/Ar and U/Th)[1,4]	
		Rina	34 Vallone di Rina breccias D: Pyroclastic breccias, lapillistones and tuffs, white-pink in color, dm-thick layers. Accessory components, cm-dm in size, with quartz xenoliths. 35 Vallone di Rina breccias C: Gray breccias with subordinate and locally discontinuous dark-gray lava flows 1-2-m thick. 36 Vallone di Rina breccias B: Pyroclastic breccias and lapillistones, poorly welded, red to white-pink in color. Thickness 20-30 m. Fall deposits. 37 Punta dell'Omo lavas: Porphyritic gray lavas in beds 1-2-m thick, with interlayered autoclastic breccias. Pyroxene phenocrysts, peculiar is the presence of xenoliths of quartz and metamorphic rocks (basaltic andesites, CA series). 38 Cugno Aghiastro pyroclastic deposits: Lapillistones with black and red scorias, gray laminated tuff, lapilli tuff, and ocher breccia tuff with black fiamme; fall, flow, surge, and lahar deposits. 39 Vallone di Rina lavas A: Gray porphyritic lavas, phenocrysts of plagioclase, pyroxene and olivine, 2-7-m thick, alternating with autoclastic breccias, 15-20-m thick; red scoria lenses and agglomerates (basaltic andesites, CA).		64,300 ± 4,900 54,800 ± 9,100 (K/Ar)[1,4] 61,500 ± 6,500 (U/Th)[1,4]	Us2: Unconformity surface related to the summit caldera collapse of the Cavoni synthem and an erosional surface in the surrounding areas.
	Cavoni		40 La Petrazza lavas C: Porphyritic lavas, pale gray in color, 1-2-m thick, with phenocrysts of plagioclase, pyroxene, and olivine; at La Petrazza, they are alternated with autoclastic breccias, with red spatters related to an eccentric eruptive vent (high-K basaltic andesites). 41 La Petrazza pyroclastic deposits B: Alternation of laminated tuffs, lapillistones, lapilli tuffs, breccia tuffs, pyroclastic breccias with accessory components, and reworked matrix-supported breccias with chaotic struture. Surge, fall, flow, and lahar deposits 42 Punta Lena pyroclastic deposits: Lapillistone, pyroclastic breccias, lappilli tuffs, and breccia tuffs. Fall and flow deposits. 43 La Petrazza lavas A: Gray porphyritic lavas in beds 1.5-2-m thick, with phenocrysts of plagioclase, pyroxene, and olivine; fractured and poorly preserved (high-K andesites and hornblende-bearing andesites).		85,300 ± 2,000 <100,000 (K/Ar)[1]	Us1: Erosional angular unconformity surface separating the deposits of the Cavoni synthem from a series of highly altered and fractured underlying lavas
			44 lavas A: Porphyritic lavas and breccias, reddish alteration.			
Strombolicchio			45 Strombolicchio unit: Volcanic neck made of holocrystalline lavas with vertical intrusive structures and interlayered porphyritic lavas and breccias (basaltic andesites of CA series).		204,000 ± 25,000 (K/Ar)[3]	

Petrographic data, in brackets, from Keller et al. (1993). Age determination by U/Th and K/Ar methods from: (1) Condomines and Allègre (1980); (2) Gillot (1984); (3) Gillot and Keller (1993); (4) Arrighi et al. (2004).

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