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Original Study

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Obsidian from the Bronze Age Village of San Vincenzo, Stromboli, Aeolian Islands: A Preliminary Investigation

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Abstract: We present the preliminary results of the ongoing investigation of the obsidian from the Bronze Age village of San Vincenzo, Stromboli, Aeolian Islands, for the purpose of providing technological and typological characterization, and also provenance of the raw material, the latter with non-destructive p-XRF. Regarding provenance, the source of the raw material is likely to be neighbouring Lipari. It was transported to Stromboli and used mostly in a highly opportunistic manner and for the production of blade(let), non-bladelike tools (mainly scrapers) and micro bladelets. The obsidian distribution around the site shows concentration in both domestic and production areas.

Keywords: Aeolian Islands; Capo Graziano; p-XRF analysis; technological classification; distribution and use.

1 Introduction

Stromboli is an active volcano and the north-easternmost island of the Aeolian Islands, an archipelago composed of seven islands in the southern Tyrrhenian Sea (Figure 1). The Archipelago has been inhabited since the 6th millennium BCE, and Stromboli has an attested human occupation from the 4th millennium BCE.

The Stromboli terrain is very steep (12.2 km^2 wide and with a volcano peak height at 926 m). There are only a few flat areas on the island, mostly on its northern coast, and San Vincenzo is the largest (a steep-sided plateau about 6 ha wide resting between 40 and 100 m a.s.l.), located in the NE: a strategic position for the control of Southern Tyrrhenian sea but with no visual contact with the other Islands (Di Renzoni, Lopes, Martinelli, & Photos-Jones, 2016a).

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The archaeological site of San Vincenzo was discovered in 1980 (Cavalier, 1981) and has been explored systematically since 2009 by the Stromboli Project: ArchEOLogIE[1], an international interdisciplinary team with scholars and students from numerous institutions and countries[2]. After geophysical investigation (Zhao, Forte, Levi, Pipan, & Tian, 2015) a series of trenches have been opened along the southeast margin of the plateau and more than 700 m² have been so far investigated, divided in three areas: East, West and North.

The main phase is represented by the Bronze Age village of the Capo Graziano *facies* (Early to Middle Bronze Age 1–2) and consists of numerous stone dwellings and terrace walls dividing the space into large rectangular zones (Bettelli, Cannavò, Di Renzoni, Ferranti, Levi, Martinelli, Mastelloni, Ollà, Tigano, & Vidale, 2016, Fig. 2; Cannavò, Bettelli, Di Renzoni, Ferranti, Levi, Ollà, & Tigano, 2017a, Fig. 3). Other relevant archaeological evidences at San Vincenzo belong to Late Neolithic, Chalcolithic, Hellenistic, Late Roman and Late Medieval phases (Levi, Bettelli, Di Renzoni, Ferranti, & Martinelli, 2011, Fig. 10C; Ferranti, Bettelli, Cannavò, Di Renzoni, Levi, & Martinelli, 2015, Fig. 4; Levi, Ayala, Bettelli, Brunelli, Cannavò, V., Di Renzoni, Ferranti, Lugli, Martinelli, Mercuri, Photos-Jones Renzulli, Santi, & Speranza, 2014; Yoon, Levi, Ollà, & Tigano, 2018).

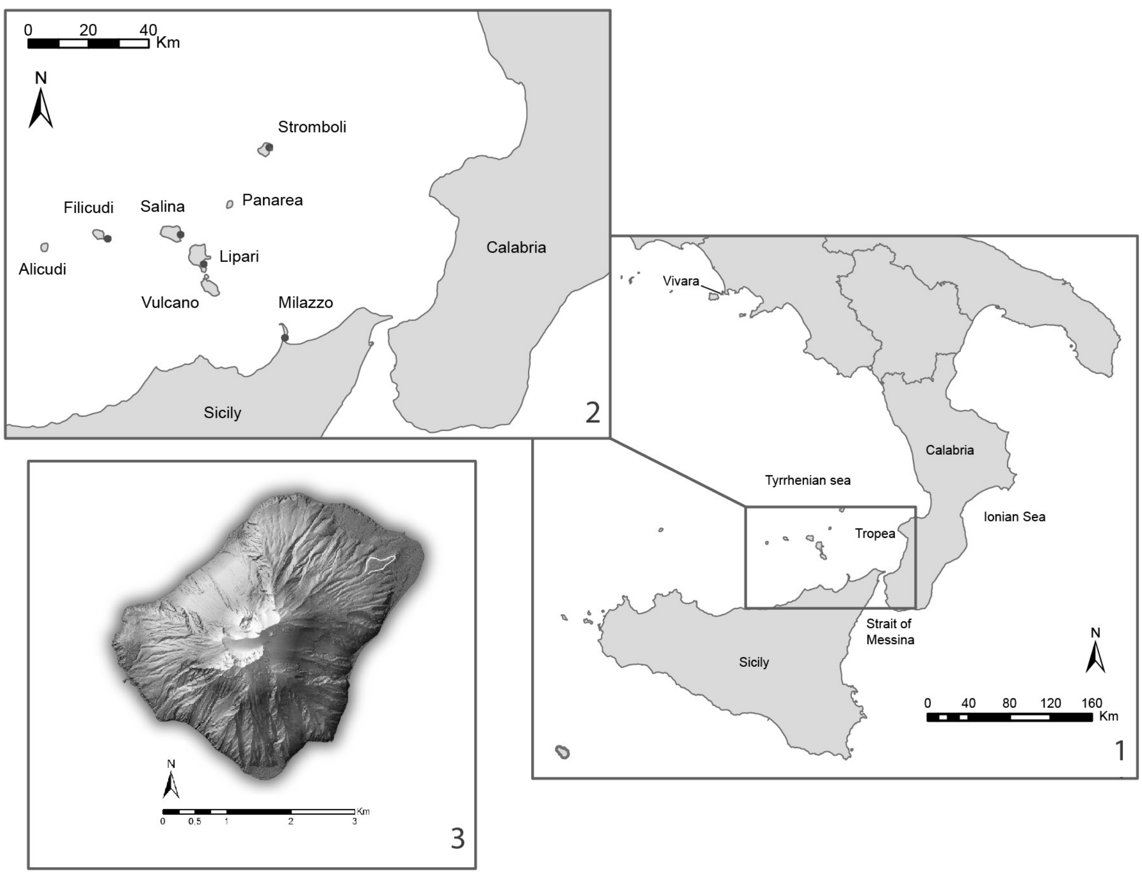

Figure 1. 1.The Aeolian islands in the lower Tyrrhenian Sea. 2 The Aeolian Islands and the location of the Capo Graziano villages. 3. The island of Stromboli with the San Vincenzo plateau in the Northeast (A. Di Renzoni).

1 Project directed by Sara Tiziana Levi, University of Modena and Reggio Emilia, Department of Geological and Chemical Sciences, in collaboration with Soprintendenza of Messina (ME-IT), Parco Archeologico delle Isole Eolie e delle aree archeologiche di Milazzo, Patti e comuni limitrofi, Lipari (ME-IT), CNR-ISMA (RM-IT) and Hunter College-The City University of New York (NY-USA).

2 67 weeks of fieldwork in 10 years (subdivided into 15 campaigns), with the participation of 30 specialists and more than 400 students (Levi, Slade, Gerguri, Edwards, & Long, 2015).

Radiocarbon dates originating from 55 Bronze Age stratigraphic contexts across the village attest to a long period of occupation during the first half of the 2nd millennium BCE. The most abundant finds are handmade burnished pottery, both locally produced and imported from other Aeolian Island and Southern Tyrrhenian areas (Brunelli, Levi, Fragnoli, Renzulli, Santi, Paganelli, & Martinelli, 2013; Cannavò, Photos-Jones, Levi, Brunelli, Fragnoli, Lomarco, Lugli, Martinelli, & Sforna, 2017b). Several Late Helladic I–II (17–15th cent. BCE) ceramics and beads imported from the Aegean indicate that Stromboli was also involved in long-distance exchange networks (Levi, Bettelli, Cannavò, Di Renzoni, Ferranti, Martinelli, Ollà, & Tigano, 2017). Obsidian is very prominent on site by comparison with other Bronze Age villages in the Central Mediterranean, but comparable to Aeolian and Sicilian contexts such as Filicudi and Milazzo (Martinelli, 1993, 2003, 2006, 2009; Martinelli, Fiorentino, Prosdocimi, d'Oronzo, Levi, Mangano, Stellari, & Wolff, 2010; Freund, 2018).

2 Methods

The study of the San Vincenzo obsidian samples presented here involved several methodological approaches aimed at addressing questions of production/function, use/distribution and also to provide a first indication of provenance of the raw material (Calliari, 2011–2012).

Provenance: non-destructive p-XRF analysis[3] was carried out while on site in June 2012 of thirty nine archaeological and five surface obsidian samples, collected by one of us (DG) from the 'Spiaggia delle Pomici' (SdP) on NE Lipari. The only reference collection available at the time was from the Spiaggia delle Pomici: this obsidian is thought to have originated from the Mt. Pilato eruption dated to the 8th c CE and thus postdating the Bronze Age village at San Vincenzo. In addition, six samples of obsidian from Melos collected by one of us (EPJ) from the two well-known prehistoric obsidian working sites on Melos, SW Cyclades (Nychia and Demenagaki) were also analysed (in Scotland) and presented here for purposes of reference. The instrument used is a NitonX3Lt-GOLDD with a 50kVAgX-raytube, 80 MHz real-time digital signal processing and two processors for computation and data storage respectively. Of the instrument's three calibration modes (TestAllGeo, Soils, Mining), the TestAllGeo (TAG) mode was selected since this gives the largest array of measurable elements. Analysis time was set at 60 seconds and three measurements were taken on each sample. Table 1 represents the average of these measurements.

Replicate analyses of NIST 2709a soil standard revealed satisfactory instrument precision (<10% Zr and <5% Rb, Fe, Ni and Sr), and good accuracy for Sr (<10%), but poor accuracy for Zr and Rb (larger than 10%). Y was not measurable in the TAG mode. We refer to the above elements in particular since obsidian provenance discourse is largely based on the plotting of the relative concentrations between these elements. Reporting ratios between elements further facilitates the comparison of data sets undertaken by different laboratories.

Although not directly relevant to the Stromboli finds, the Melos data set is introduced here, to confirm accordance with published work, outwith the Lipari non-prehistoric material. Further to our own three data sets (Stromboli archaeological finds, SdP surface finds and Melos (Glasgow data set)), we also discuss those of others pertaining a) to the two known Liparian sites (Gabellotto and Canneto Dentro by Tykot (2017)) and b) obsidian from both Lipari and Melos analysed by Acquafredda, Muntoni, & Pallara (2018).

Production and function: techno-economical characterization of 2508 pieces was carried out (1314 of which found in the Bronze Age Capo Graziano layers). The methodology involved the technological classification of the finds and the definition of the châine opératoire (Leroi-Gourhan, 1943; Laplace, 1968; Inizan, Reduron-Ballinger, Roche, & Tixier, 1999; Bar-Yosef & Van Peer, 2009; Arzarello, Fontana, & Peresani, 2012).

3 Non destructive pXRF analyses have been performed at San Vincenzo also for the investigation of pottery (Cannavò et al., 2017) and soils (Di Renzoni, Ayala, Brunelli, Levi, Lugli, Photos-Jones, Renzulli, & Santi, 2016b).

Table 1. Chemical compositions of the obsidian artefacts from San Vincenzo (SV) and reference material from Lipari and Melos, determined by p-XRF. Element contents are expressed in ppm.

SV sample	Zr	Sr	Rb	Nb	Th	Pb	Zn	Fe	Mn	Cr	V	Ti	Ca	K	Bi	Al	Si
1373	138	15	148	31	71	41	35	7364	453	52	77	514	6275	26064	76	37871	215064
1511	130	15	144	30	51	32	23	7718	365	67	99	690	8096	25449	54	23920	109617
1513	133	18	146	28	64	35	32	7741	429	77	78	697	6471	20211	69	22850	106147
1516	148	17	162	30	72	37	43	7606	465	38	58	369	5578	30510	76	64159	361030
1519	128	17	145	28	67	24	23	7549	354	73	94	680	8427	28020	66	23156	109812
1528	138	15	152	28	67	38	43	6943	449	29	64	352	4338	34939	67	51769	325523
1529	133	18	150	32	65	39	30	7933	435	72	87	682	8665	22612	73	22632	109195
1550	139	14	157	31	66	37	36	7197	490	27	67	486	5174	37591	65	59303	341318
1555	137	12	155	29	65	33	31	6907	401	30	61	347	5275	53487	73	58533	343626
1559	136	16	146	30	58	36	34	7618	413	71	76	678	6589	19821	nd	nd	nd
1579	133	16	146	30	70	26	37	7592	398	79	74	681	8648	20153	74	22246	104886
1584	138	15	149	31	64	31	38	7847	484	72	92	680	8150	25210	64	22640	106442
1596	137	19	150	30	64	29	30	7733	451	82	75	685	8198	28386	67	22475	103734
1612	143	17	150	33	67	33	34	7604	498	29	86	427	4946	32973	69	50863	318571
1612	140	13	152	30	70	32	34	7466	376	38	56	384	4851	30423	74	57750	339177
1614	135	22	150	33	68	25	46	8085	407	94	74	730	6696	20574	73	22018	105109
1616	139	17	148	28	75	34	33	8083	356	79	101	696	6826	21432	75	22429	108737
1619	144	14	157	34	66	38	39	7439	411	25	65	402	5325	29879	72	68318	368231
1632	134	12	153	28	73	42	39	7110	441	38	58	397	4965	28657	75	61085	340590
1643	130	16	143	30	55	32	31	7296	362	81	76	612	8287	24231	49	17998	95735
1648	140	19	153	32	66	33	33	7805	347	74	93	583	7584	26645	67	17099	94594
1649	132	17	144	30	69	36	47	7684	384	69	85	676	7781	22111	74	20349	97987
1653	142	17	154	33	62	30	32	7838	309	73	79	649	7382	25263	53	18760	99075
1654	208	15	275	30	61	24	65	7600	371	20	86	603	5954	19540	50	17627	95858
1657	135	16	146	28	64	29	40	7637	385	71	96	633	7504	24299	57	18831	94265
1659	136	19	148	31	67	37	33	8129	403	64	95	821	9742	26887	68	19769	95266
1660	136	15	148	31	69	30	44	7883	409	67	71	704	8198	20098	65	18304	94362
1671	134	16	149	30	67	37	45	7807	416	71	86	743	7854	19601	60	18234	93323
1675	139	17	152	30	70	35	45	7056	417	29	65	398	12245	36979	70	59737	338876
1676	129	17	141	29	64	28	30	7864	403	82	89	715	8144	24877	66	24871	110440
1677	142	16	157	31	74	34	39	7781	455	28	70	390	5258	29751	76	63263	347477
1678	135	16	152	31	65	25	21	7941	305	74	101	725	8533	26505	58	22709	110552
1680	139	17	148	32	71	36	40	8050	474	72	96	671	8910	20869	72	23092	108507
1682	136	18	147	30	63	30	26	7765	394	22	69	689	8397	28252	61	18617	95885
1703	136	16	148	32	62	21	37	7676	430	21	87	716	6961	20133	58	22547	105589
1712	129	16	149	31	60	37	25	7592	402	68	76	733	8510	33772	63	21867	102781
1717	134	18	148	28	60	47	27	8027	267	81	107	717	8247	24361	58	24383	111759
1743	137	15	154	31	70	38	45	7609	440	29	84	473	5576	29743	69	66513	359073
3054	142	19	147	35	71	35	43	8671	442	60	100	828	7147	20151	72	22262	102313
Lipari 2B	154	20	148	34	79	26	43	8208	450	73	87	681	8524	26765	83	22591	109006
Lipari 3	151	17	159	33	76	37	46	7925	497	45	57	373	5163	34544	77	62626	344683
Lipari 4	150	16	160	36	75	36	51	7631	466	25	68	367	4642	35456	72	60132	344781
Lipari 5A	144	14	155	32	69	36	39	7546	486	31	67	372	4310	32910	71	54985	337412
Lipari 6B	150	13	153	31	70	39	40	7562	385	31	76	359	4786	36895	71	63271	360207
Melos 1	86	97	60	7	18	20	23	4930	457	29	127	900	7822	19473	17	60508	345179
Melos 2	86	96	60	8	20	18	21	4880	480	33	135	841	7196	19750	18	60696	364854
Melos 3	84	92	58	7	17	20	22	4641	433	23	132	783	8506	18952	17	55804	341982
Melos 4	91	106	52	7	19	14	26	6229	411	22	121	982	10203	21970	16	54633	327621
Melos 5	91	103	54	7	19	16	24	5982	452	19	120	930	9432	17634	15	58467	197518
Melos 6	89	106	53	7	21	16	26	6224	458	26	123	948	9231	19100	17	49156	305126

Use and distribution: every find from the archaeological site was collected according to a 1x1m grid system, the topographical general framework of the excavation. The weight in grams of the different kinds of artifacts collected from a single Stratigraphic Unit in a single square was entered in a Geo-DataBase. Specific queries were applied to identify the quantities per square from the Bronze Age layers. The result was consequently displayed in a GIS environment assigning to every square of the grid a different color according to the quantity of all the obsidian items from the western area of the excavation (about 18x20, 350 m^2), expressed by weight. The distribution of the tools was tested for Trench 3 of the Western Area, measuring 14x8 m. The distribution of the obsidian is compared with other finds.

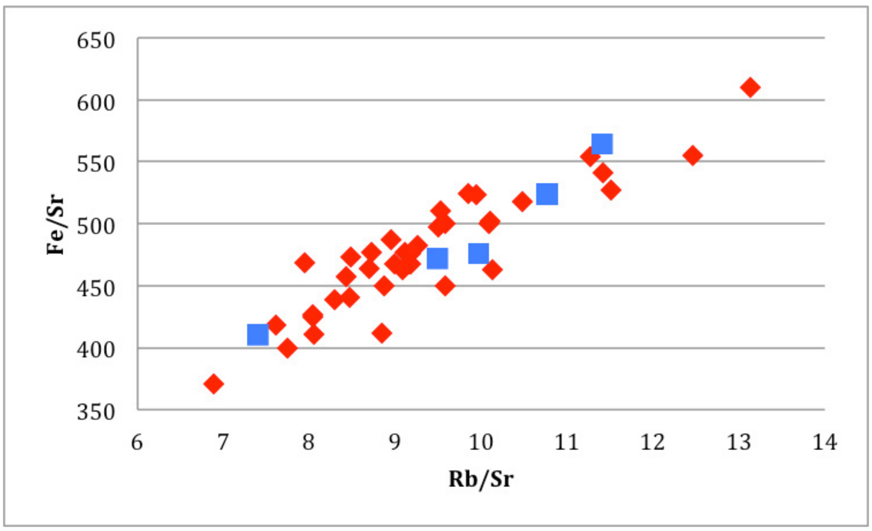

Figure 2a. Fe/Sr vs Rb/Sr. Stromboli: red diamonds; SdP, Lipari reference obsidian: blue squares. The latter fall within the Stromboli collection group. The SdP obsidian does not constitute an obsidian source, merely presence thereof.

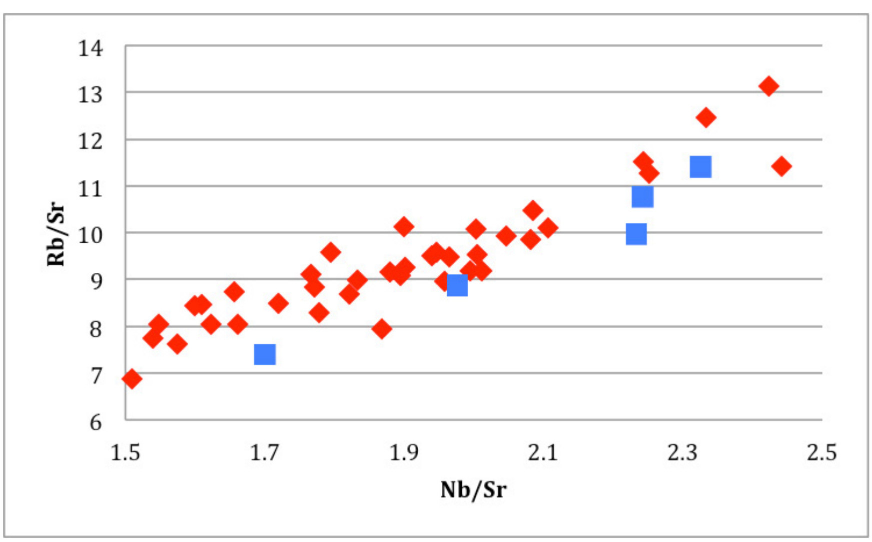

Figure 2b. Rb/Sr vs Nb/Sr. Stromboli: red diamonds; SdP, Lipari reference obsidian: blue squares. The latter fall within the Stromboli collection group.

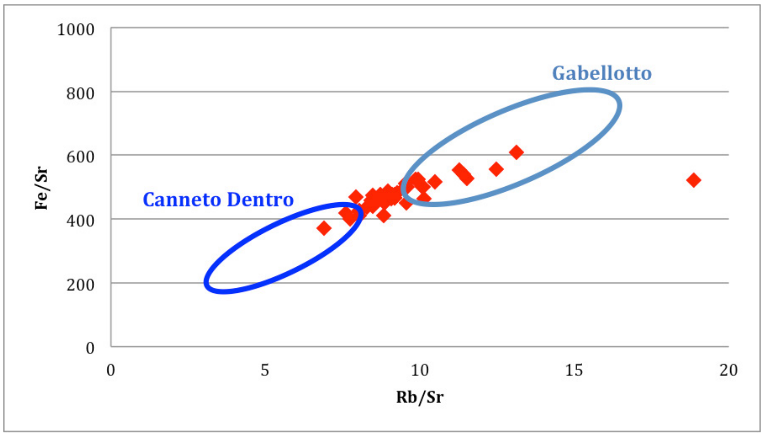

Figure 2c. Plot of Fe/Sr vs Rb/Sr (after Tykot 2017, Fig. 3). The two prehistoric sources Gabellotto and Canetto Dentro appear well separated on the basis of the ratio of these three elements but the Stromboli collection (red diamonds) falls in between and skimms the edges of both rather than falling within one group or the other.

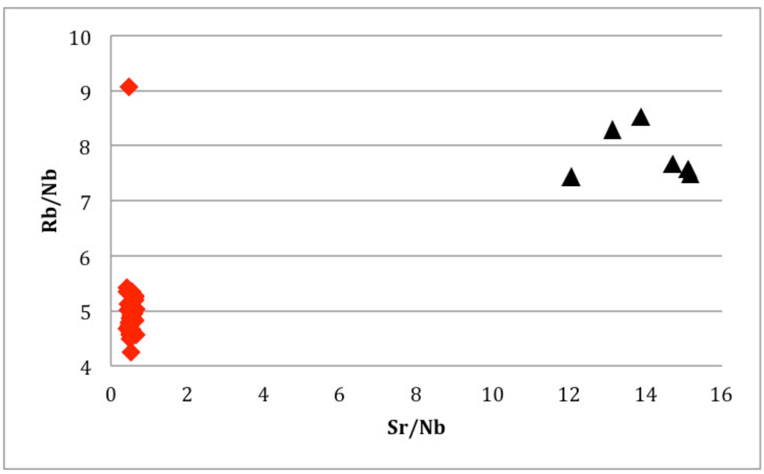

Figure 2d. Rb/Nb vs Sr/Nb. Stromboli: red diamonds; Melos (Glasgow collection): black triangles. Stromboli archaeological material has an Rb/Nb which is tightely set between 4 and 6 (but with an outlier at 9) and low Sr/Nb; Melos, geological material, on the other hand has an Sr/Nb ratio which is between 12 and 16 and is very distinct from the Lipari/Stromboli groups. See also Fig 2e.

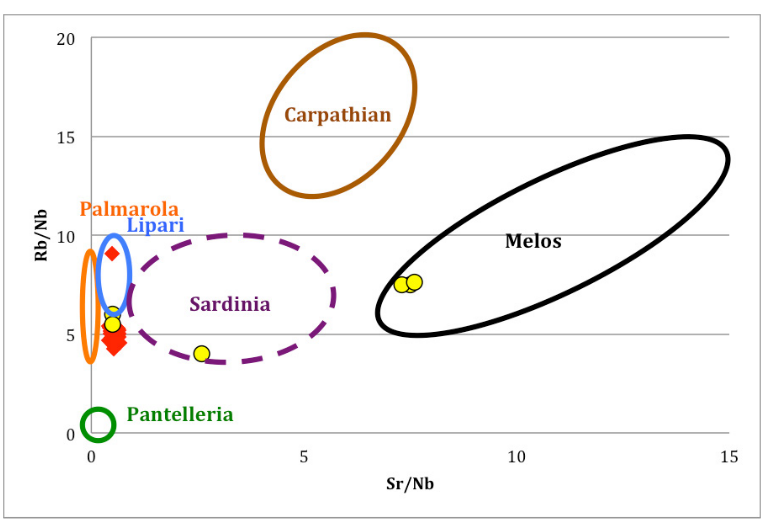

Figure 2e. Rb/Nb vs Sr/Nb from Stromboli and two published data set: Tykot (2017, compositional ranges from fig. 4a) and Acquafredda et al. 2018 (yellow circles). There is a good agreement between the Stromboli group (red diamonds) and the Acquafredda Lipari's data.

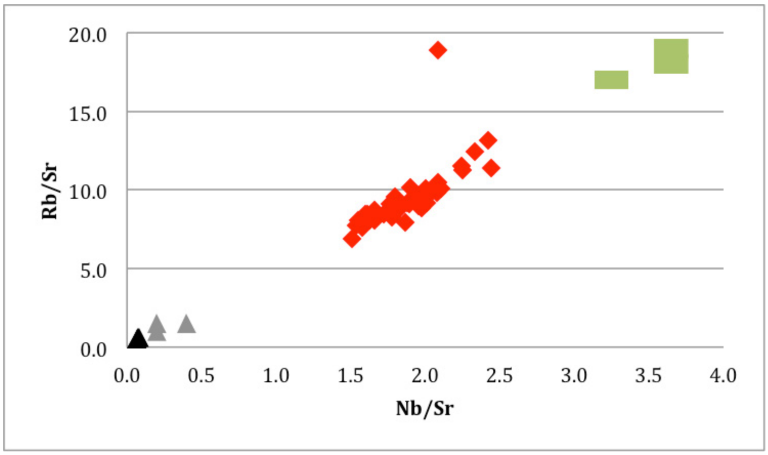

Figure 2f. Rb/Sr vs Nb/Sr. Stromboli: red diamonds; Glasgow Melos collection: black triangles; Acquafredda et al. (2018, fig. 5, tab. 1) Melos collection: grey triangles; Acquafredda et al. Lipari collection: green squares.

3 Results

3.1 Provenance

p-XRF analyses are shown in Table 1 and Figs. 2a-g and encompass the data deriving from: the Stromboli obsidian, the SdP obsidian, the Glasgow Melos obsidian, the Acquafredda et al. (2018) group and with regards to their own Lipari and Melos collections and the Tykot (2017) data set. We address particular issues as outlined below (the outlier #1654 is not represented in all the figures).

3.1.1 The Stromboli Collection and the SdP Obsidian

Figure 2a shows a plot of Fe/Sr vs Rb/Sr for two data sets: the Stromboli finds and the five SdP samples. We demonstrate that for these two ratios SdP samples fall within the Stromboli group. Similarly, figure 2b shows a plot of the ratios Rb/Sr vs Nb/Sr and again the SdP surface finds fall within the Stromboli group. We suggest that although the origin of these surface finds is not known, ie they may or may not be from the 8th century CE eruption, there is nevertheless a good agreement with the Stromboli group and some obsidian from the latter must have originated from 'that' source.

3.1.2 The Gabellotto and Canneto Dentro Obsidian Sources and its Relevance to the Stromboli Collection

Figure 2c is taken from Tykot (2017, Figure 3) and shows the same element ratios as those shown in figure 2a. The Stromboli obsidian spans the totality of the Liparian group which is made up of the two sources (and perhaps more) since it has an Rb/Sr ratio between 5 and 15 as opposed to 5 and 20 shown by Tykot. The Stromboli Fe/Sr ratio falls between 400 and 600 which is still within the 'greater Lipari' group but not necessarily associated conclusively with either the Gabellotto or the Canneto Dentro sources. Instead the Stromboli collection ratios skim the edges of those for both localities.

3.1.3 Setting the Scene for the Lipari Obsidian: Lipari vs Melos

Figure 2d shows a plot of the Rb/Nb and Sr/Nb ratios for one additional group, i.e. the Glasgow Melos group. The Stromboli group clusters very tightly on the left hand corner of the plot and with a Rb/Nb ratio between 4 and 6 with one outlier at 9. The Melos group clusters on the upper right hand corner of the same plot and an Sr/Nb ratio which is between 12 and 16 and is very distinct from the Lipari/Stromboli groups.

Figure 2e shows the Tykot data for both Lipari and Melos but also other sites as well not relevant to this discussion. The ratio for Rb/Nb is between 6 and 10 (as opposed to our 4 and 6 excluding the outlier). For the Sr/Nb ratio for their own Melos data they shows a range between 7 and 15 which incorporates out data set (between 12 and 15). It should be mentioned here that our Melos data set for Rb/Nb is in better agreement with the Acquafredda et al. (2018) Melos data set (between 4 and 6) than with the Tykot (2017) data set.

Finally figure 2f sets our data set in the context of the results of the Acquafredda et al. (2018) group which combines their own Melos and Lipari samples and with respect to ratios Rb vs Nb/Sr. With regards to the Melos group theirs and our analyses are in agreement but the Stromboli group is set well apart from their Lipari group.

p-XRF results of the analysis of the Stromboli obsidian show that Lipari was a likely source for the raw material. There is a good agreement between the Spiaggia delle Pomici (SdP), surface samples and the Stromboli collection, for ratios of Fe/Sr, Rb/Sr and Nb/Sr. There is also good agreement with the data sets of other investigators (Acquafredda et al., 2018) and with regards to the Rb/Nb ratios (Figure 2e) but less also with the data sets of the same group and with regards to Nb/Sr (Figure 2g). We cannot ascribe the Stromboli finds to either the published Gabellotto or Canneto Dentro sources but perhaps another source within Lipari.

3.2 Production

The protohistoric assemblage, summarized in Table 2, is made up for 8% of blades *l.s.*, for 18% of flakes, for 10% of unidentifiable *débitage* products, for 10% of cores, for 4% of tools that lack a distinct ventral surfaces and for 50% of *debris* (Figure 3). No refit has been found.

The lithic assemblage is characterized for:

• the flakes are small-medium sized (only one is > cm 5x5) and were obtained through hard-hammer direct percussion. There are, though, also evidences of bipolar percussion on anvil;

• the blades *l.s.* don't exceed cm 5 length (although few broken blades would have). There are not only very regular blades *l.s.* with linear or punctiform butts, that suggest standardized pressure *débitage* method, but also blade-like products, with irregular morphology and wide butts, that seem to suggest hard-hammer opportunistic *débitage*;

• the cores are mainly small sized and show the total depletion of the lithic volumes, mostly through opportunistic methods, mainly with the removal of bladelets and microbladelets, at least in the last moments of *débitage*;

• natural cortex is attested and is found mostly on blades *l.s.*, showing not only the importation of raw material blocks, but also how the reduction sequences were started;

• the retouched products are the 21,8% of the lithic assemblage (excluding cores and *débris*). Retouch operations are mostly concentrate on small flakes, in order to create scrapers through simple and/or scaled removals. Amongst blade products, only few bladelets (~8,7%) show evidence of retouch, while the ~46,3% of blades *s.s.* is retouched.

3.3 Use and Distribution

The distribution of the obsidian in the Western area of the excavation (Figure 4A) clearly shows a significant concentration related to the Hut 3, especially near the hearth (Ferranti et al., 2015, Fig. 6; Cannavò et al., 2017a, Fig. 7a), and to the area upslope of hut 2, where a 'productive area' has been investigated (area W: Ferranti et al., 2015, Fig. 2, Cannavò et al., 2017a, Fig. 5) (Figure 5). Similar concentrations are also observed with the pottery (Levi, Bettelli, Cannavò, Di Renzoni, Ferranti, & Galliano, 2018, Fig. 4) A less significant

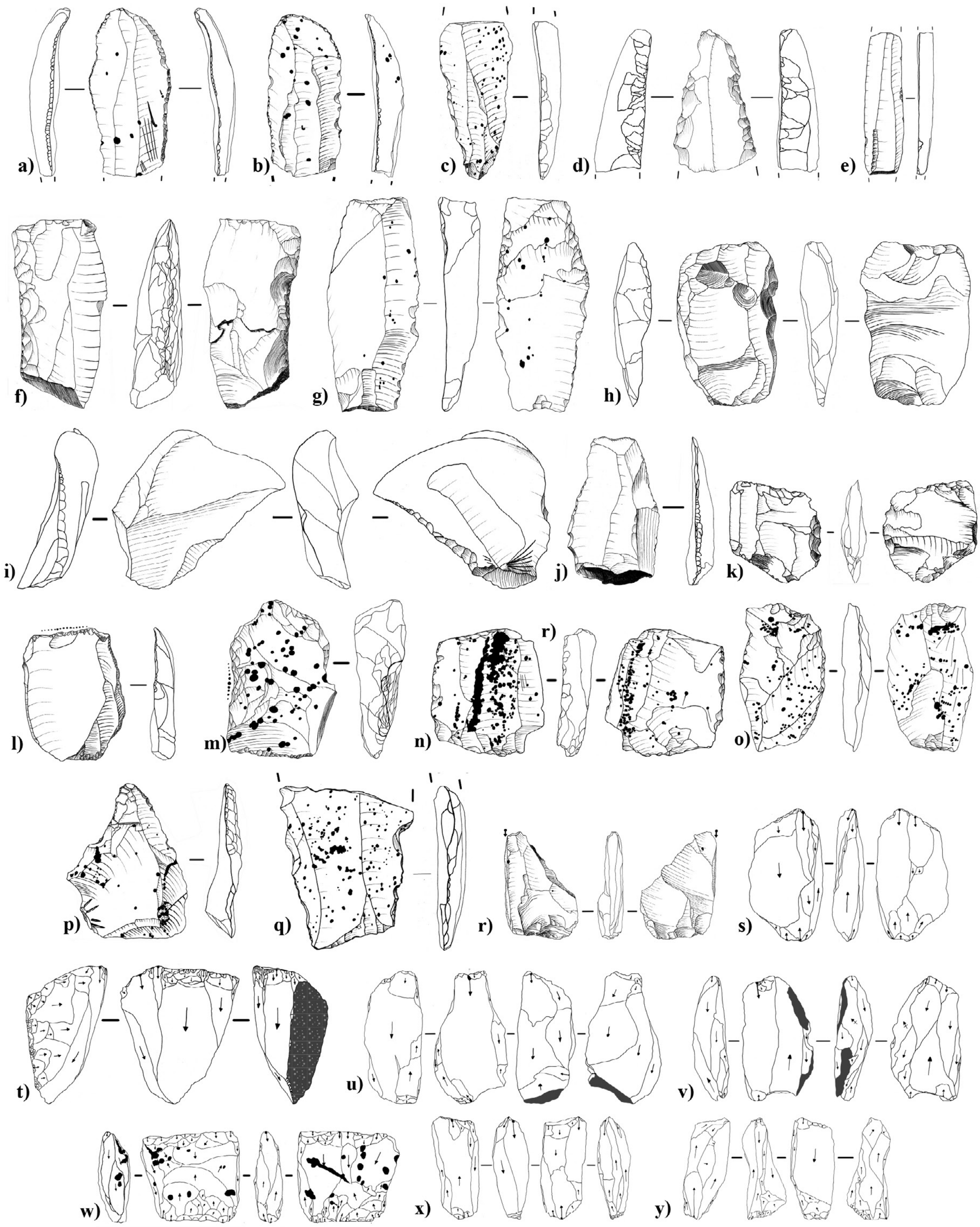

Figure 3. Examples of the obsidian assemblage at San Vincenzo. a. b. f. blade scrapers; c. d. h. backed blades; g. q. truncations; i-o flake scarpers; p. point; r. burin; s-y cores (D. Calliari).

concentration, in terms of primary use, is in the southern edge of the excavated area, close to the wall O (probably the high quantity in this zone is related to the depth reached during the excavation process).

Table 2. Obsidian tools at San Vincenzo according Laplace typology.

Type		n.
Burins	B1	4
	B2	2
	B5	1
	B8	1
End scrapers	G1	1
	G3?	1
	G5	1
Truncations	T1	1
	T2	1
Backed blades	LD1	4
	LD2	3
Cran	C1	1
	C6?	1
Flat retouches	F5?	1
Points	P1	4
	P2	1
Blade scrapers	L1	12
	L2	1
	L3	1
Flake scrapers	R1	29
	R2	7
	R3	7
	R4	8
Backed	A1	5
	A2	4
Denticulates	D1	3
	D2	2
	D4	1
	D6	1

The same pattern can be read when we consider the distribution of the tools only: the test performed in Trench 3 (located in the north-east portion of the Western area): the analysis shows a high numbers of items around the hearth of hut 2 (Levi, Bettelli, Cannavò, Di Renzoni, Ferranti, & Martinelli, 2012, Figs. 5, 6) and a significant concentration south of the same hut (Figure 4B). Summarizing, the obsidian finds are quite homogeneously widespread across the whole site, though there are 'qualitative' differences between dwelling and non-dwelling contexts. In the dwelling contexts retouched flakes are highly represented and they are associated with the few«big» flake cores found, while in non-dwelling contexts unretouched flakes are prevalent and the cores are mainly small-sized and exhausted; instead blades *l.s.* are widespread in every context, even if limited in number. This distribution pattern seems to point to the waste and/or residual nature of the lithic assemblages of the site, beside the ones found in the dwelling contexts. If we compare the obsidian assemblage in the San Vincenzo huts with the contemporary ones at Milazzo Viale dei Cipressi (Martinelli, 2006, 2009), despite the different preservations of some contexts (huts 2 and C at Stromboli are probably more disturbed), it is evident that there is a common prevalence of flake scrapers at both sites (Table 3) in the most preserved contexts: Hut 1 in San Vincenzo (Levi et al., 2011, Figs. 7c, d) and Hut 1 in Viale dei Cipressi (Levi, Tigano, Vanzetti, Alessandri, Barbaro, Cassetta, Castagna, Gatti, Sabatini, & Schiappelli, 2003; Levi, Prosdocimi, Tigano, & Vanzetti, 2009).

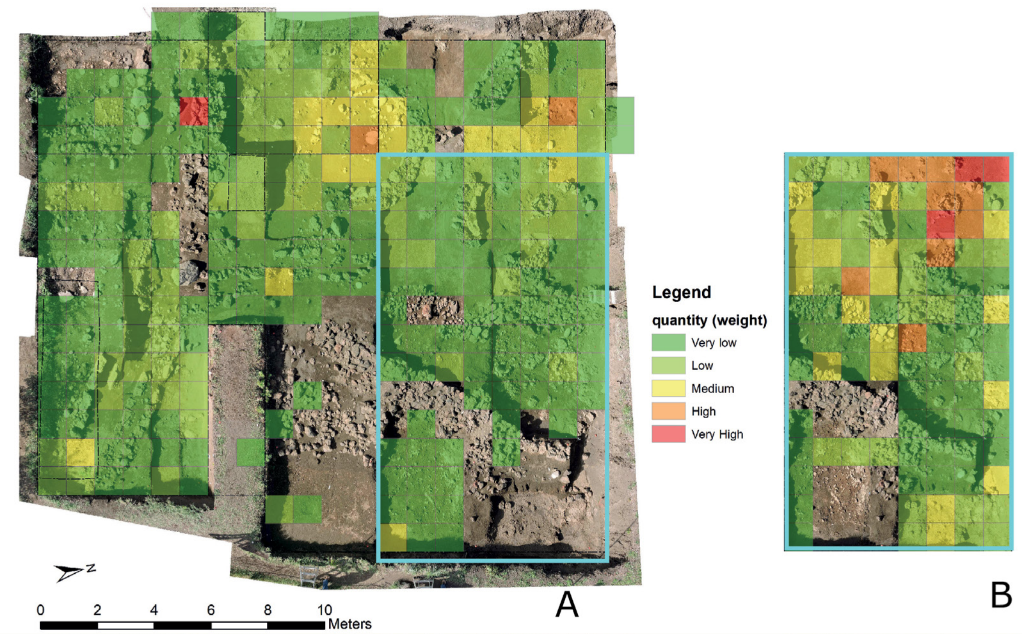

Figure 4. Obsidian distribution in the 1x1 m grid of the excavation (see Fig. 5): A. all the finds in the Western area; B. tools in the Trench 3 (north-east portion of the Western area) (V. Cannavò, A. Di Renzoni).

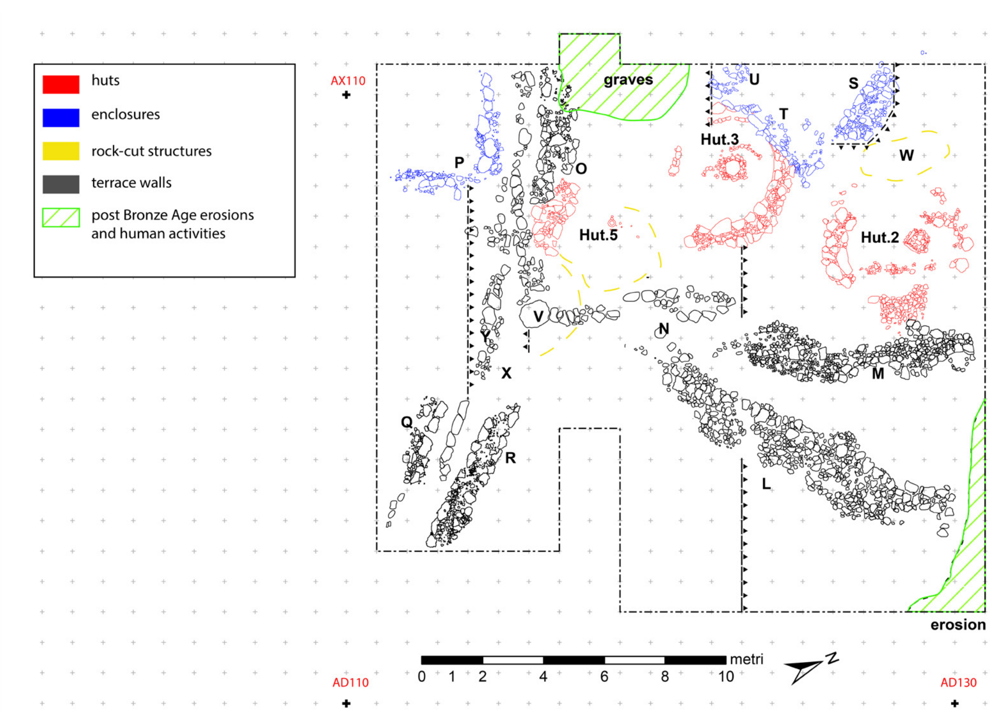

Figure 5. Western area: the main structures and the 1x1 m topographical grid (A. Di Renzoni, L. Lopes, D. Pantano).

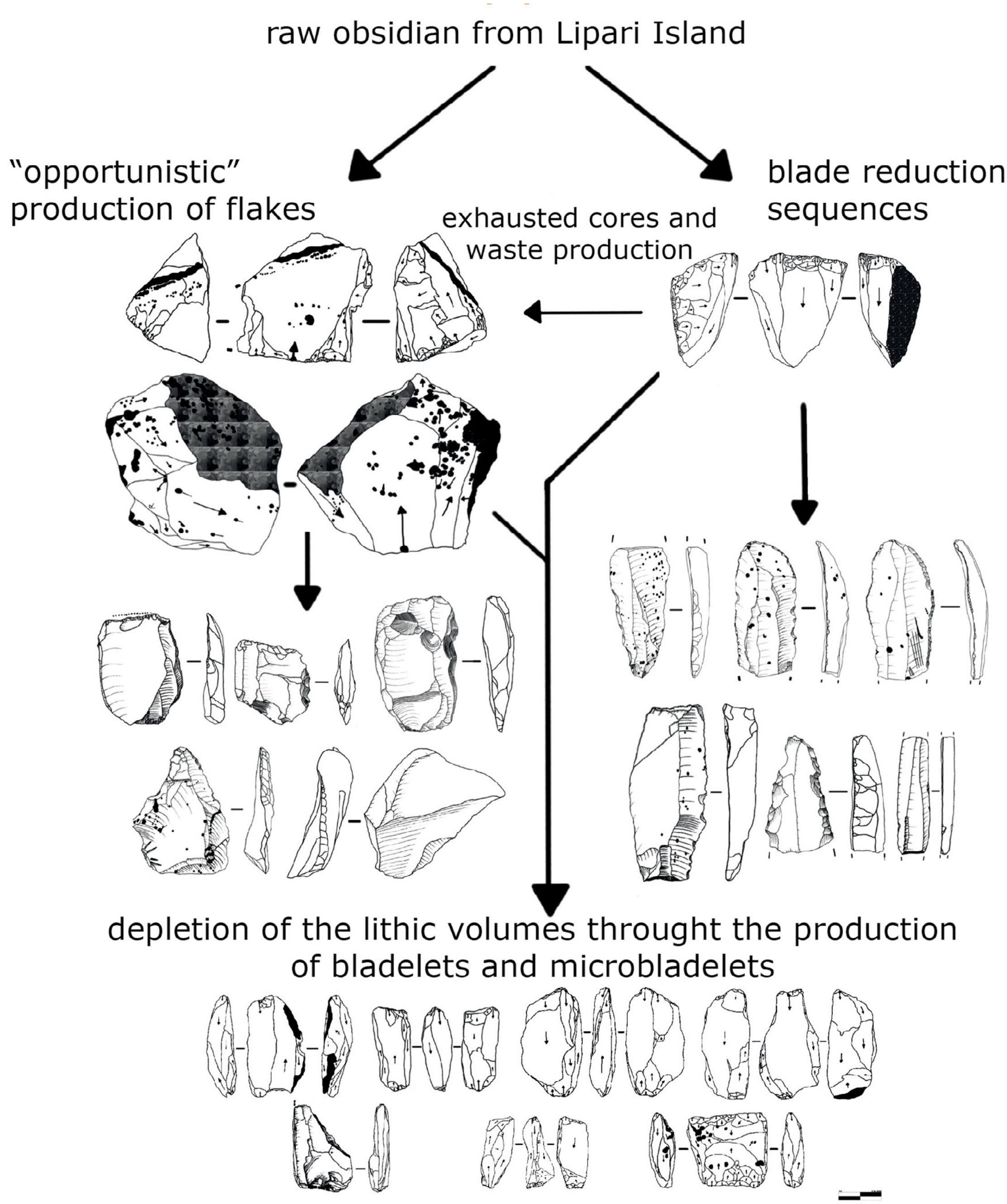

Figure 6. Chaine operatoire at San Vincenzo (D. Calliari).

Table 3. Obsidian tools in Bronze Age huts at San Vincenzo and at Milazzo Viale dei Cipressi - MVC.

	Stromboli			Milazzo	
	Hut 1 - Area East	Hut 2 - Area West	Hut C - Area East	Hut 1 - MVC	Hut 3 - MVC
Burins	3			2	
End scrapers				3	2
Truncations				1	
Backed blades	3				
Cran					
Flat retouches				2	
Points	1			3	1
Blade scrapers	1		1	4	1
Flake scrapers	7	3	1	17	2
Backed	2			3	1
Denticulates				2	3

4 Discussion

The preliminary results of this study seem to show that the lithic industry of San Vincenzo site was focused on the maximum exploitation of the raw material arrived from Lipari, as suggested not only by the profusion of small-size exhausted cores that show highly opportunistic *débitage* practices, but also by the prominence of *débris* and by the lack of cores and *débris* of big dimensions (Figure 6). The analysis of the distribution, considering all the finds and the tools only, show significant concentration of the obsidian in domestic contexts such as huts 1, 2 and 3 but also in the productive area W. It seems that the depletion of the raw materials was mainly aimed, at least in the last moment of the reduction sequences, to the obtainment of blade-like products of small dimension and was carried out not only by hard hammer opportunistic *débitage*, but, as some finds seem to attest, also by more standardized bipolar reduction sequences.

Although both the products and the cores of blade *débitages* aren't numerically consistent, it is also possible to hypothesize that one of the principal aim of the obsidian exploitation at San Vincenzo site was the production of blades *l.s.*: this, not only considering the residual/waste nature of most of the lithic assemblage, associated with the presence of regular blade products that show the existence of standardized and (usually) highly-productive blade *débitage* methods, but also assuming the «exportation» in other contexts of the blades *l.s.* obtained through these methods. This hypothesis matches also with the fact that natural cortex is highly represented on the few blades *s.s.* found, therefore suggesting the existence of blade reduction sequences that started from unprepared obsidian blocks. Simultaneously to this blade productions, there were also reduction sequences which aim was the production of flakes, as attested in the dwelling contexts; however, since retouched flakes are found in the whole site, it is probable the utilization of the technical waste of the blade reduction sequences as blank for tools.

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