Sedimentological analysis of marine deposits off the Bagnoli-Coroglio Site of National Interest (SNI), Pozzuoli (Napoli) Bay

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Key words: Sedimentology; Sea sediment contamination; Brownfiled site; Bagnoli ; Pozzuoli Bay; Tyrrhenian Sea

Abstract

We present the results of a sedimentological and mineralogical study conducted on 305 marine sediment samples (32 seafloor grab samples and 273 subseafloor samples from 91 vibrocores) collected in the marine area of the eastern Pozzuoli Bay, offshore the area of Bagnoli, that has been the site of heavy industrial activity for more than a century.

The coastal (onland-offshore) area of Bagnoli–Coroglio has been recognized as a contaminated Site of National Interest (SNI) by the Italian Ministry of the Environment (2000-2001) and since then it has been the subject of a series of environmental studies that have documented a severe contamination of soils onland and marine sediments offshore.

Based on the outcomes of the sedimentological classification discussed in this study we have constructed a series of thematic maps illustrating the areal distribution of the sedimentary facies at different stratigraphic levels. Our interpretation provides a support in reconstructing the complex set of environmental changes that have affected the offshore of the eastern Pozzuoli Bay prior to and after the termination of the industrial activity of the Bagnoli brownfield.

Introduction

In many countries the health risk assessment for population living in highly industrialized coastal areas is a matter of current debate and study, having these areas a severe environmental impact on natural habitats.

Industrial activity near the coast, invariably play an important role in transferring pollutants both into the water column and marine sediments. Seafloor deposits, especially their fine-grained fraction ultimately act as a reservoir for chemical waste, mainly represented by heavy metals and organic pollutants. Contaminants may be eventually recycled through chemical or biological processes, and should be therefore monitored for environmental quality assessment [1,2,3,4,5].

Bagnoli-Coroglio, is an urban district located on the eastern coast of the Pozzuoli (Naples) Bay (Tyrrhenian Sea, Italy), within the active volcanic area of Campi Flegrei. During the last century, the coastal plain between the town of Bagnoli and Nisida Island has been the site of heavy industrialization (steel production, concrete production, asbestos materials manufacturing). From 1990 to 2000 all the industrial activities in the area were terminated, and the Bagnoli brownfield district including the adjacent marine sector, was classified as Site of National Interest (SNI) by the Italian Ministry of the Environment (2000-2001) (Fig.1). Since then, the coastal area of Bagnoli has been the subject of a series of studies that have documented the occurrence of contaminants, including toxic metals (high concentrations of Cu, Co, Cr, Pb, Zn and Ni, notable Zn mobility), and organic substances (POP, or PAH , PCB and OCP) present both in the soil and in the sea sediments of the Gulf of Pozzuoli [6,7,8,9,10,11,12,5,13]

Due to the volcanic nature of rocks forming the landscape and seafloor bedrock of the Campi Flegrei-Pozzuoli Bay area, both the coastal plain and inner shelf of Bagnoli area are characterized by mixed siliciclastic-volcaniclastic depositional systems, where volcaniclasts often constitute the main source of marine sediments (see also Sacchi et al., this volume).

The ILVA steel plant has been undoubtedly the most important factory of the Bagnoli industrial district (Fig. 1). From the beginning of its activity, in 1910, the steelworks made extensive use of coal, iron ores and limestone as raw materials. The industrial activity in addition resulted in the development of an enhanced naval activity in the area.

The Bagnoli industrial district had a notable impact also on the coastal morphology and on the local marine hydrodynamics due to the construction of two piers in front of the ILVA (1920), and the bridging between Nisida Island and the mainland (1935). Further modifications of the natural landscape were represented by the seaward extension of the coastline by the partial infilling between the two piers (1962-1964), realized with waste material from the industrial area, and the artificial enlargement of the beaches of Coroglio and Bagnoli. All these morphological changes have severely influenced the coastal marine habitats and depositional processes within the inner shelf of the Pozzuoli Bay.

The aim of this study is to analyze and discuss an updated sedimentological dataset (grain size, mineralogy and facies analysis) from sediment samples acquired off the Bagnoli-Coroglio SNI within the frame of the Research Project ABBaCO (Pilot experiments for the environmental restoration and balneability of the Bagnoli-Coroglio coastal area), for the development of new approaches towards the remediation of the contaminated areas and restoration of marine habitats.

Sampling and analytical methods

The data set analyzed in this study consists of 32 seafloor sediment samples collected by Van Veen grab (May 2017) and 273 subseafloor samples collected from 91 boreholes using a 6-m-long vibro-corer with 10 cm inner diameter (November 2017), for a total of 305 sediment samples covering the study area. Sampling operations and the subsequent sets of laboratory analysis were conducted following the directives of the national program for the assessment of marine pollution of highly contaminated Italian coastal areas (D.L. 152/06), defined as Sites of National interest (SNI). A differential global positioning system was used locate each sampling station (Fig 1).

Laboratory sampling and sediment pre-treatment were realized according with SNI procedure (DM 7/7/2008, par. 7) that establishes a sampling resolution of 50 cm-thick stratigraphic intervals for sediment cores longer than 2 m beneath the seafloor (bsf). In our case, up to 6 sub-samples have been taken for each core whenever possible (0-50 cm, 50-100 cm, 100-150 cm, 150-200 cm, 200-300 cm, 300-400 cm). Each sample was homogenized and, in this way, regarded as representative of the entire interval, sampled and stored at 4 °C. For the grain-size analysis the sediment samples were prepared following the method of Romano and Gabellini [14]. All samples were successively treated with a hydrogen peroxide solution, then washed with distilled water, dried at 40°C and weighed. In order to separate the sandy fraction from the sediment bulk, samples was wet-sieved using a sieve 63 µm, and then the coarser fraction (> 63 µm) was further separated into grain-size components by sieving at 0.5 phi intervals (ASTM series sieves with meshes ranging from −2 to+4 phi). The pelitic fraction (< 63 µm) was instead analyzed using a laser particle sizer (Helos/Quixel Sympatec). Grain-size statistics (Mean size, Sorting, Skewness and Kurtosis) was calculated using the method outlined in Folk and Ward [15]. Sediment types were determined according to the classification of Nota [16] that provides an appropriate representation of the sediment textures variability, as a function of the depositional environments [17,18,19]. Microscope observation was conducted on the coarse fraction of all sieved samples in order to recognize the principal constituents (Fig 2) and detect the occurrence of anthropogenic elements.

A selected number of 25 sediment samples (9 Van Veen grab samples along with 16 samples collected from 5 sediment cores at various depths) were also processed for mineralogical analysis. Samples were previously dried at 80 °C, powered with the Mocronisinf Mill (Mc Crone) and with the addition of a-Al_2O_3 as internal standard, were characterized by X-ray diffraction (XRPD) using a Panalytical X'Pert diffractrometer. The instrumental operative conditions were: CuKα radiation at 40 kV and 40 mA, 3–70° 2θ range, step scan 0.02°, time 60 s/step with the use of the Topas 5.0 (Bruker) software package. The bulk sample (superficial sediment) mineralogy, instead, was investigated on dried (T= 50 °C) and powered samples by X-ray diffraction (XRD) using a D8 Advance (Bruker), equipped with Sol-X energy dispersive detector, Cu-Kα radiation and scanning speed of 2 2°ϑ/min. The semi-quantitative analysis of minerals was performed according to methods and data reported by Schultz [20] and Barahona et al. [21]. The results of mineralogical analysis are summarized in Tab 1. of supplementary materials.

Results

Sedimentological analysis

138 The marine sediment samples are mostly characterized by a conspicuous sandy fraction consisting predominantly of lithoclasts, mainly of volcanic origin (pumice, scoriae, glass shards, minerals), and subordinately of bioclasts (shells and fragments of bivalves and gastropods, bryozoans, echinoderms, sponge spicules, fragments of rhodoliths, foraminifera). A number of samples collected in the shoreface area of the Bagnoli SNI, close to the piers, contain a significant component of anthropic origin, including coal fragments and dark scoriae with oxidation patina, metal fragments, sometimes even in spheres, yellowish glass blisters, dark granules with slag-like appearance, cemented clast aggregates of different nature, and tarred aggregates (tar lumps and/or tar-coated lithoclasts). Other samples are characterized by the significant occurrence of plant remains, mostly represented by *Posidonia oceanica*.

Based on the facies analysis of sediments and sampling methods, we can recognize four main areas characterized by relatively homogeneous facies associations (Fig.1).

Area 1 (NW)

The area corresponds to the waterfront between Rione Terra and Bagnoli where seafloor samples have been collected with Van Veen grab. In the shoreface area, from -5 to -15 m, the sediment is predominantly composed of moderately sorted, coarse to medium sand with lithoclasts and bioclasts, with subordinate gravel (15-19%) (stations 100 and 101) (Fig 2-a). Mean size (Mz) is from -0.07 to 2.82 phi (from very coarse to fine sand). Skewness and kurtosis values range from -0.25 to 0.28 phi (from coarse skewed to near symmetrical), indicating a coarse component in the distribution, and 0.79 to 0.36 phi (from platicurtic to leptocurtic, respectively).

From -15 to -40 m water depth, the deposits are characterized by very fine pelitic sand with lithoclasts and bioclasts, with mean size from 3.66 to 1.93 phi. At that depths the sediments are poorly sorted and the value of skwness and kurtosis shows coarse to fine tail. Station 107 has 55% of gravel fraction mainly composed of rounded pumice, litoclasts and bioclasts, and is characterized by the occurrence of tarred aggregates (Fig 2-b). Statistic parameters indicate a fine tail.

Area 2 (SW)

This area represents the distal offshore sector from -40 to -110 m water depth. The sediments collected in this area by Van Veen grab are represented by pelitic sand with lithics and very rare bioclasts, in the vicinity of coast, whereas sandy pelite characterizes the distal part of the sector, down to 100 m water depth. Silt content ranges from 32% to 70%, while the clayey percentage is from 7 % to 26%. The sandy fraction is made of very fine lithoclastic sand with a minor bioclastic component. Samples display very poorly sorted sand and fine to very fine-skewed and mesokurtic to leptokurtic trend, with a fine tail. Mean size value range from 4.26 to 6.47 phi. All samples yield anthropic components with the exception of the northernmost stations of the sector (from 111 to 115).

Area 3 (SE)

The area is located between Nisida Island and Punta di Trentaremi, from -5 to -60 m depth and includes 6 samples collected with Van Veen grab. The sediment mainly consists of moderately sorted, coarse and very coarse sand with lithoclasts and bioclasts. Station 123 is characterized by gravelly sand, where gravel represents 18%. The bioclastic fraction is generally abundant and in stations 120 and 123 it also includes fragments of rhodoliths. Mean size ranges from 0 to 1.21 phi. The sediment texture can be described as coarse-skewed to near-symmetrical and mesokurtic.

Area 4 (NE)

The area corresponds to the Bagnoli offshore. It is characterized by the highest density of sampling stations, where marine sediment samples have been collected using a vibrocorer. Area 4 can be subdivided into three sectors, namely: a) Northern sector (between the northern pier and Bagnoli); b) Central sector (between the two piers) and c) Southern sector (between the southern pier and Nisida)

a) Northeastern sector: the area extends between the Bagnoli beach (Arenile) and the northern pier, from - 2 to - 30 m water depth. The uppermost interval (0-50 cm) of the core samples is mostly represented by poorly to moderately sorted, medium to very fine sand with lithoclasts and rare bioclasts. Samples collected in the vicinity of the northern pier include a slight pelitic fraction. Mean size values range from 1.09 to 3.98 phi. Grain size distribution is nearly symmetrical to negatively or positively skewed, and mesokurtic to leptokurtic. The average grain size of the marine deposits generally increases down in the cored sections. For instance, samples from the interval 50-100 cm (e.g. stations 4, 7 and 17) display a Mz from 0.81 to 1.57 phi, negative skewness and a coarse tail. Sediments sampled from the stratigraphic interval 100-150 cm (e.g. stations 15, 12, 19) are characterized by Mz from 0.95 to 2.17 phi and negative skewness. Samples from interval 150-200 cm in more distal areas (e.g. stations 25, 38) show a mean size around 2 phi.

Anthropogenic material commonly occurs within the surficial interval (0-50 cm) in all the stations close to the northern pier (Fig 2-c,d) and in stations 1 and 2 off Bagnoli beach. The deposits are poorly sorted (Mz values range from 1 to 3.3 phi) and include constituents of anthropic origin generally represented by tarred aggregates and coal fragments. Moreover, in the immediate vicinity of the pier, samples also yield dark slag with oxidized patinas and metallic spheres, bulky glass, and metallic granules. At coring stations 23, 25 and 27 the anthropic component is present down to the stratigraphic interval 100-150 cm.

b) Central sector: It extends between the two piers, from -4 to - 50 m water depth. Samples from the uppermost interval (0-50 cm) of the cored sediments, up to a water depth of -10 m, are made of moderately to very poorly sorted, fine and very fine, slightly silty sand with lithoclasts and rare bioclasts. Mean grain size values are 2.57 to 5.05 phi. Sediment texture is positively to very positively skewed and leptokurtic to very leptokurtic. A significant component of anthropic origin constituted by common coal fragments and tar aggregates is also recorded (Fig 2-e). The average grain size of the deposits generally increases with depth. Samples cored from the stratigraphic interval 100-150 cm are made up by poorly to moderately sorted, medium and fine sand with lithoclasts and rare bioclasts (Mz: 1.68-2.97 phi; negatively to nearly symmetrical skewed and leptokurtic).

The lowermost stratigraphic interval (200-300 cm) of coring stations 31 and 32 has been selected for additional sampling of selected sediment layers (samples “200-300 red”), respectively at 258 cm 255cm, prior to the mixing procedure. These samples are composed of slightly silty medium sand with gravel fraction (4.5 and 8.5%). Main constituents are represented by partly rounded volcaniclasts, sometimes characterized by an oxidation patina (Fig 2-f).

Sediments sampled at coring station located in water depth higher than 20 m are made of very sandy pelite. Also in this case the average grain size of the deposit tends to increase, along with the the bioclastic fraction, down in the stratigraphic succession (i.e. from the 100-150 interval) (Fig 2-g).

The anthropic component is present in all the stations of the area (with the exception of stations 60, 61 and 45), and it also occurs at depth within intervals 0-50 cm, 50-100 cm and 100-150 cm, or even deeper (150-200 cm) at coring stations 42, 43 and 64 bis, in proximity of the northern pier. In some cases (e.g. interval 50-100 cm of coring station 48), the sediment is almost completely constituted by coal fragments (Fig 2-h).

Stations 84 bis, 77 and 77/bis, sampled only for the 0-50 level, are represented by poorly sorted, very coarse sand with lithoclasts and bioclasts and anthropic component (almost tarred aggregates) (gravel% from 22.46 to 15.81; Mz: 0,35-1.23 phi, nearly symmetrical skewned and mesokurtic) (Fig 2-i).

c) Southern sector: it corresponds to the marine area from - 1.70 to - 15 m water depth between the southern pier and Nisida Island. The sediments collected in this sector are only from the uppermost stratigraphic interval (0-50 cm) and are characterized by medium to fine lithoclastic sand with rare bioclasts, below the coast (Mz from 1.26 to 3,36 phi, moderately to poorly sorted and from negatively to symmetrical skewed). At water depths higher than 10 m, seafloor deposits are mainly represented by fine to very fine pelitic sand with lithoclasts (Mz: 2.5-4 phi, negatively to positively skewed). Stations 85 and 90bis (gravelly fraction respectively 17% and 21%; Mz: 0.8-1.4 phi), are represented by gravelly bioclasts. Significant occurrence of anthropic component, characterized by tarred aggregates, coal fragments and metal slag, is recorded from stations 62, 63, 70, 80, 85, 90/bis, 94, 95 and 128.

Mineralogical assemblage

The analysis of the mineralogical pattern of sand (2–0.2 mm) and clay (-2.0 μm) fractions in the core samples, allowed for the identification of major components represented by feldspar (7<sanidine<29% and 6<albite<26%) and subordinately pyroxene (3<x<12%). Mica, chabasite, quartz, analcime, philipsite, hematite, calcite and halite are also present, in percentage lower than 9%, where halite correspondsto the phase with minimum percentage (max. 2%). Furthermore, in all samples a significant percentage (15<x<59%) of amorphous minerals can be recognized, particularly in core samples 23 and 52.

Samples from cores 33 and 37 show the highest content of sanidine and albite (24<x<29% and 20< x <26%, respectively). The maximum percentages of pyroxene have been measured in samples from core 37. Very similar percentage value have been detected for mica, chabasite, quartz, analcime and halite in all core samples. The highest percentage of philipsite is recognised in core 61, whereas calcite mainly occurs in core 52. The superficial interval (0-50 cm) of coring stations 37 and 61 yield the highest content of hematite. In all superficial sediments, we have recognised feldspar (7<anorthoclase<85%) and mica (3<x<74%). Plagioclase, dolomite and halite are generally present with low percentage (3<x<10%; 2<x<8%; 1<x<9%, respectively). A few samples include kaolinite and calcite, with percentage lower than 22. Clay minerals and quartz have been only detected in one sample (station 116). Leucite occurs in all samples.

Summary and conclusion

The results obtained from this sedimentological study provide a support in reconstructing the complex set of environmental changes that have affected the offshore of the eastern Pozzuoli Bay since the termination of the industrial activity of the Bagnoli brownfield. The characterization of study samples was obtained using the classification of Nota [16] that provides an adequate representation of the sediment textures variability, as a function of the depositional environments.

The results of sedimentological classification of the deposits has been then utilized to construct a series of maps, illustrating the areal distribution of the sedimentary facies at different stratigraphic levels. Particularly, the maps of Fig. 3 summarize the results of textural classification and the information on main constituents obtained of each sampling station, for each stratigraphic interval. The maps illustrated in Fig. 4 visualize a simplified areal distribution of classification for each sampled stratigraphic interval.

Facies distribution of surficial and subseafloor sediment shows, as a general trend, that sandy deposits prevail in the shoreface area, whereas the pelitic fraction is more abundant both in the distal sectors and in the area between the two piers, down to the stratigraphic interval 150-200 cm (Fig.4).

Sandy deposits recovered at depth between the two piers, such as samples 31 and 32 (interval 200-300red cm), and particularly sample 35 (interval 300-400 cm), likely present the result of significant sedimentary input deriving from the erosion and/or reworking of palesols and paralic/continental material. We infer that these sandy deposits represent the product of the late-stage filling of the Bagnoli valley due to a phase of progradation/aggradation of the coastal system (< 2 ka) whereas the overlying succession of pelitic sediments (from 200-300 cm up to 50 -100 cm) may be partly the result of a subsequent subsidence phase (> 2 ka) and associated marine transgression. The relatively abundant pelitic fraction of samples from stratigraphic interval 0-200 cm of area 4, may be also be related to reduced circulation and low-energy conditions caused by the presence of the two piers and to the bridging between Nisida Island and the mainland (Fig 4).

The anthropic component of the deposit is particularly abundant in samples of area 4 and subordinately Area 2, from the seafloor down to a depth of 150-200 cm, likely as a result of almost a century of intense industrial activity and associated marine traffic (Fig. 3).

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Disclosure statement

No potential conflict of interest was reported by the authors

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Figures

Fig 1. Morphobathymetric map of the Eastern Pozzuoli Bay with location of the Bagnoli-Coroglio Site of National Interest (SNI) and seafloor sampling stations.

Fig 2. Photographic documentation of the coarse fraction of selected samples from the Bagnoli-Coroglio SNI (see text for description): a) Grab station 100, Area 1; b) Grab station 107, Area 1; c) Vibrocore station 21, level 0-50, Area 4-northern sector; d) Vibrocore station 39, level 0-50, Area 4-northern sector; e) Vibrocore station 34, level 0-50, Area 4-central sector; f) Vibrocore station 32, level 200-300 red, Area 4-central sector; g) Vibrocore station 58, level 100-150, Area 4-central sector; h) Vibrocore station 48, level 0-50, Area 4-central sector; i) Vibrocore station 77bis, level 0-50, Area 4-central sector. (1) Tarred aggregate; (2) Coal fragment; (3) Blast furnace slag aggregate.

Fig 3. Synopsis of grain-size and facies analysis of marine sediments for each sampling station at various stratigraphic intervals. a) colour dots indicate sedimentological classification according to Nota [16]; b) gray-scale lozenges indicate the main constituents of the coarse-grained fraction.

Fig4. Sketch maps showing the areal distribution of marine sediment textures within the Bagnoli-Coroglio Site of National Interest (SNI). Sedimentological classification is according to Nota [16].

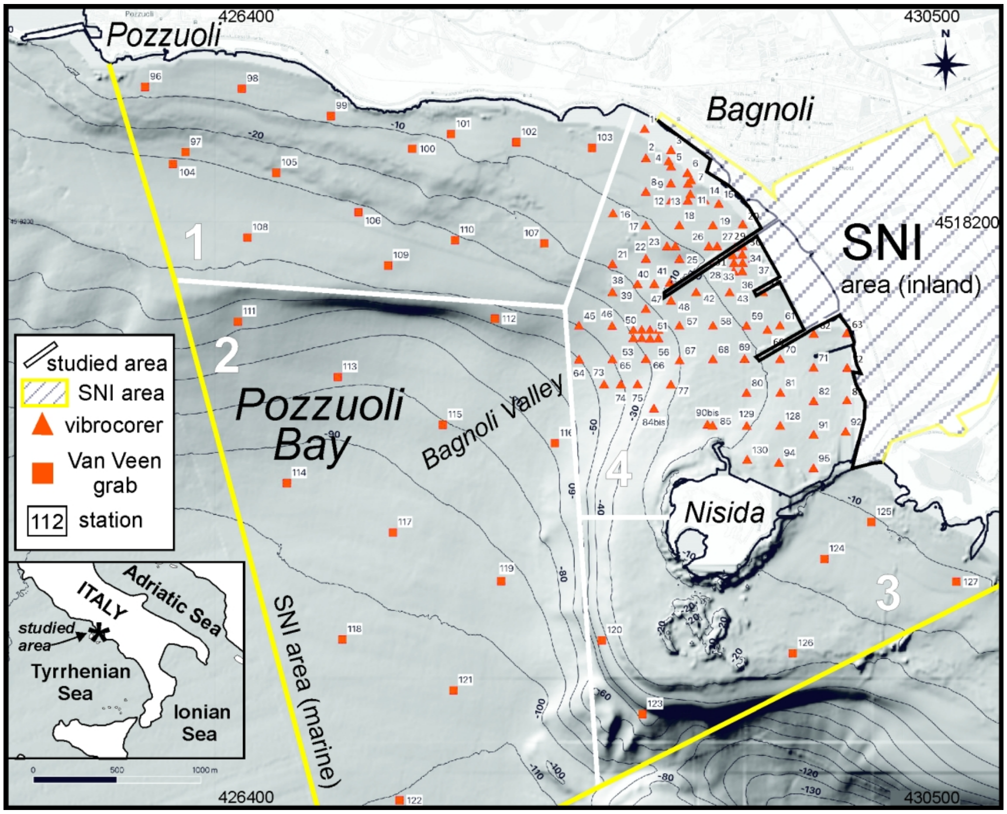

Fig 1. Morphobathymetric map of the Eastern Pozzuoli Bay with location of the Bagnoli-Coroglio Site of National Interest (SNI) and seafloor sampling stations.

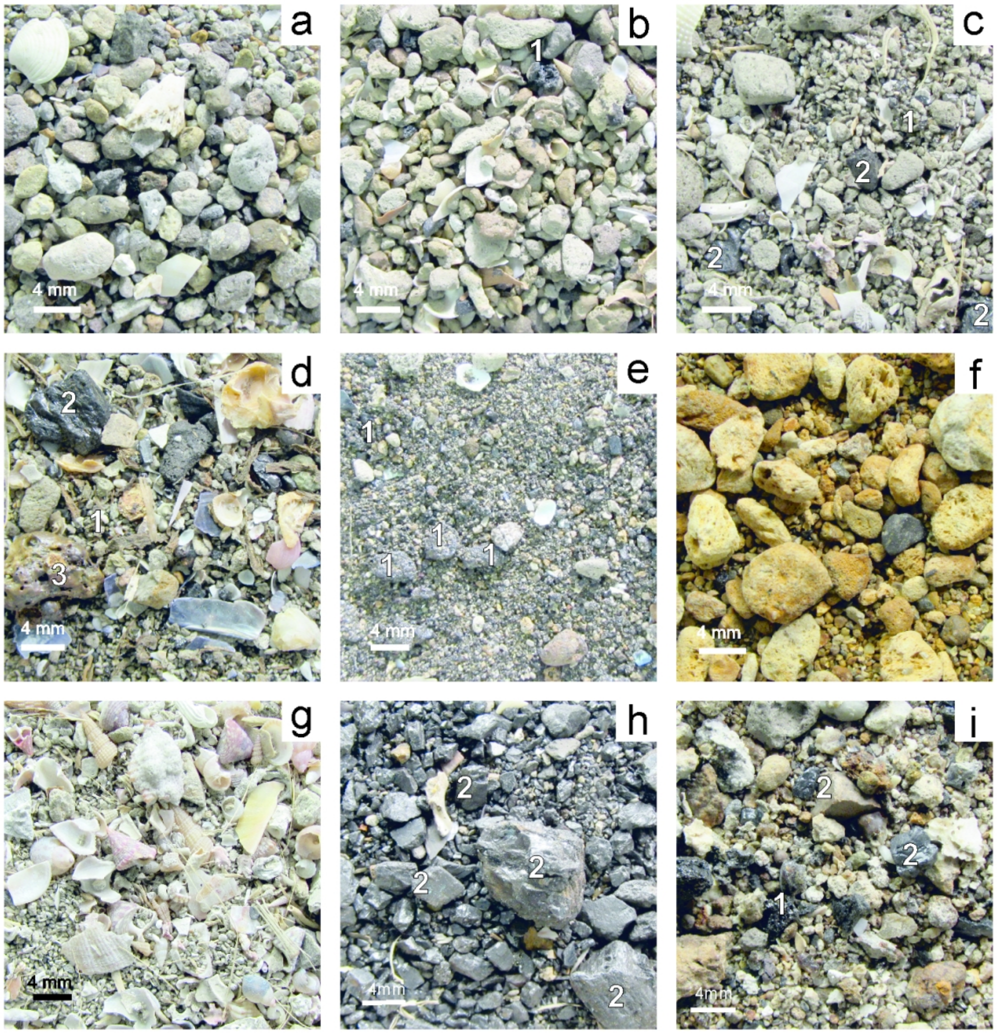

Fig 2. Photographic documentation of the coarse fraction of selected samples from the Bagnoli-Coroglio SNI (see text for description): a) Grab station 100, Area 1; b) Grab station 107, Area 1; c) Vibrocore station 21, level 0-50, Area 4-northern sector; d) Vibrocore station 39, level 0-50, Area 4-northern sector; e) Vibrocore station 34, level 0-50, Area 4-central sector; f) Vibrocore station 32, level 200-300 red, Area 4-central sector; g) Vibrocore station 58, level 100-150, Area 4-central sector; h) Vibrocore station 48, level 0-50, Area 4-central sector; i) Vibrocore station 77bis, level 0-50, Area 4-central sector. (1) Tarred aggregate; (2) Coal fragment; (3) Blast furnace slag aggregate.

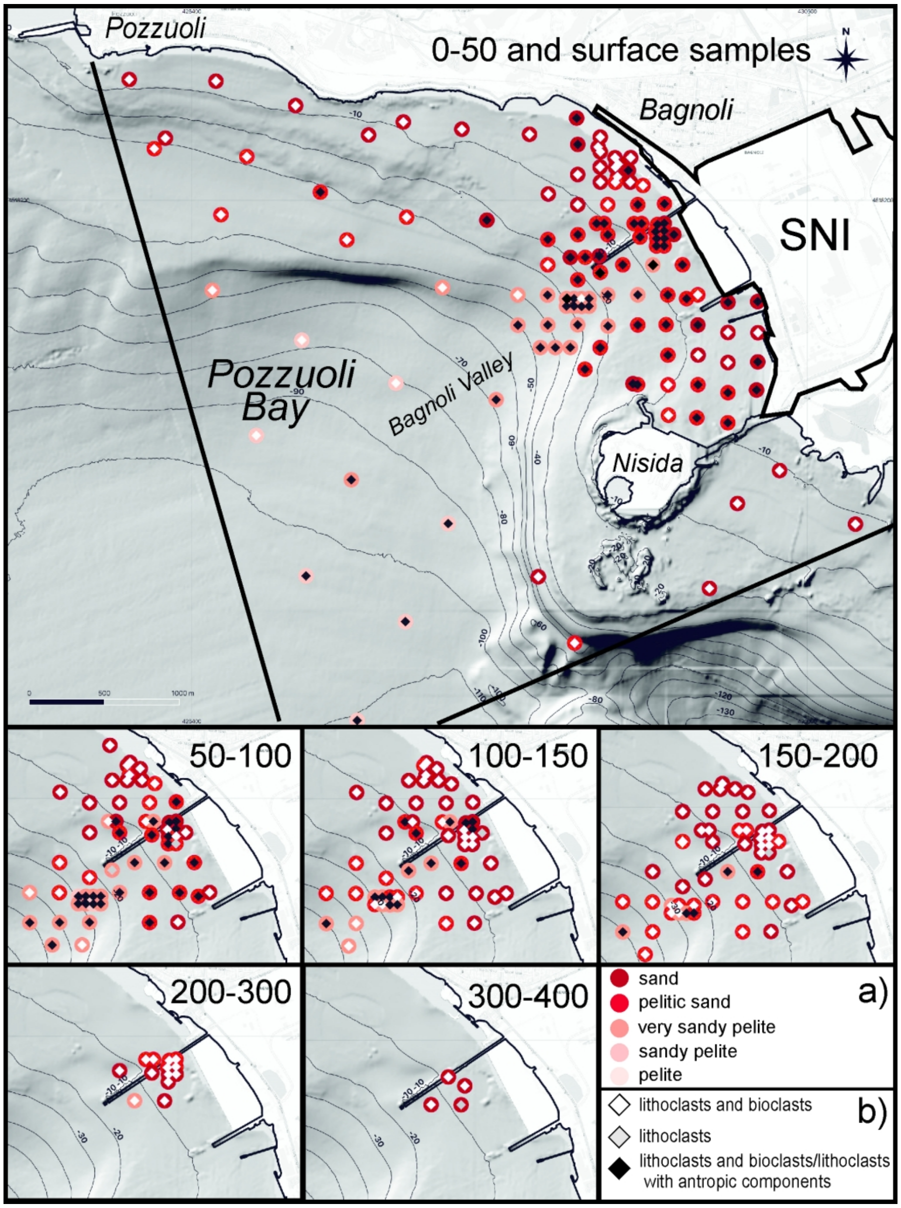

Fig 3. Synopsis of grain-size and facies analysis of marine sediments for each sampling station at various stratigraphic intervals. a) colour dots indicate sedimentological classification according to Nota [16]; b) gray-scale lozenges indicate the main constituents of the coarse-grained fraction.

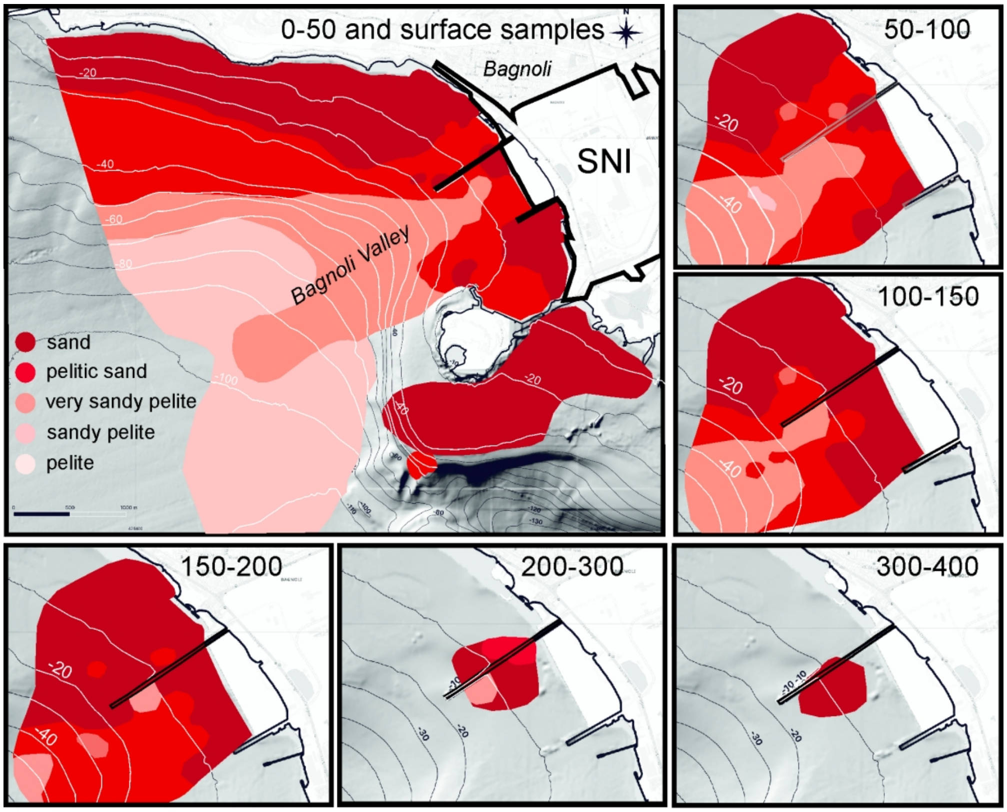

Fig4. Sketch maps showing the areal distribution of marine sediment textures within the Bagnoli-Coroglio Site of National Interest (SNI). Sedimentological classification is according to Nota [16].

Station	Sample	Area	Northing	Easting	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Coarse (%)	Pelitic (%)	Mean_size (phi)	Sorting (phi)	Skewness (phi)	Kurtosis (phi)	Mediana (phi)	Mica %	Quartz %	Calcite %	Halite %	K-feldspar (sanidine) %	K-feldspar (anorthoclasio) %	Plagioclase %	Dolomite %	Leucite %	Clay minerals %	Kaolinite %	Chabasite %	Albite %	Analcime %	Pyroxene %	Philipsite %	Hematite %	Amorfo %
1	0-50	2	4518746,62	428963,15	5,48	93,01	0,00	0,00	98,49	1,51	1,09	1,15	-0,14	1,06	2,64																		
2	0-50	2	4518571,67	428970,78	1,44	95,13	0,00	0,00	96,57	3,43	1,51	0,87	-0,01	0,95	2,09																		
3	0-50	2	4518620,41	429120,67	2,01	96,73	0,00	0,00	98,74	1,26	2,22	1,11	-0,26	1,21	1,25																		
4	0-50	2	4518554,20	429106,20	1,86	96,57	0,00	0,00	98,43	1,57	2,77	0,71	-0,09	1,03	2,39																		
	50-100	2	4518554,20	429106,20	5,28	89,79	4,93	0,00	95,07	4,93	1,57	1,52	-0,01	0,95	1,56																		
5	0-50	2	4518522,01	429120,88	0,48	97,14	0,00	0,00	97,62	2,38	1,99	0,91	-0,04	1,12	2,77																		
6	0-50	2	4518483,63	429218,78	0,00	98,75	0,00	0,00	98,75	1,25	1,90	0,72	0,04	1,07	1,89																		
7	0-50	2	4518440,08	429239,78	0,00	99,13	0,00	0,00	99,13	0,87	2,64	0,87	-0,13	1,44	2,11																		
	50-100	2	4518440,08	429239,78	0,00	98,60	1,40	0,00	98,60	1,40	1,28	0,74	0,10	1,00	1,24																		
	100-150	2	4518440,08	429239,78	0,84	97,27	0,00	0,00	98,11	1,89	1,31	0,89	0,02	1,04	1,31																		
7bis	0-50	2	4518484,05	429323,40	0,72	97,85	0,00	0,00	98,57	1,43	2,11	0,59	-0,03	0,96	1,57																		
8	0-50	2	4518371,53	428970,40	0,22	97,79	0,00	0,00	98,01	1,99	2,77	0,69	0,02	1,08	2,77																		
9	0-50	2	4518421,26	429119,48	0,64	95,12	0,00	0,00	95,76	4,24	2,90	0,73	-0,02	1,23	2,66																		
10	0-50	2	4518420,26	429221,78	0,06	98,95	0,00	0,00	99,01	0,99	1,55	0,81	-0,05	1,24	1,52																		
	50-100	2	4518420,26	429221,78	0,67	97,74	1,59	0,00	98,41	1,59	1,61	1,07	-0,10	1,00	1,69																		
	100-150	2	4518420,26	429221,78	0,41	92,38	6,19	1,02	92,80	7,20	2,75	0,91	0,09	1,39	2,75																		
11	0-50	2	4518356,74	429235,75	0,00	96,46	0,00	0,00	96,46	3,54	3,04	0,62	0,00	1,00	2,81																		
	50-100	2	4518356,74	429235,75	0,09	93,91	5,21	0,78	94,00	6,00	2,99	0,67	0,20	1,15	2,91																		
	100-150	2	4518356,74	429235,75	0,15	95,40	4,44	0,00	95,56	4,44	2,72	0,81	-0,14	1,14	2,78																		
	150-200	2	4518356,74	429235,75	1,57	94,16	4,27	0,00	95,73	4,27	2,27	1,19	-0,25	1,25	2,43																		
11bis	0-50	2	4518398,95	429307,69	0,25	97,62	0,00	0,00	97,88	2,12	2,65	0,81	-0,25	1,13	2,00																		
	50-100	2	4518398,95	429307,69	0,54	95,61	3,85	0,00	96,15	3,85	2,45	0,84	-0,02	1,17	2,45																		
	100-150	2	4518398,95	429307,69	0,17	95,14	4,69	0,00	95,31	4,69	2,43	0,83	0,00	1,20	2,45																		
12	0-50	2	4518321,16	429121,47	0,27	95,82	0,00	0,00	96,09	3,91	2,64	0,99	0,17	1,51	2,76																		
	50-100	2	4518321,16	429121,47	0,23	95,09	4,68	0,00	95,32	4,68	2,86	0,72	-0,06	1,17	2,87																		
	100-150	2	4518321,16	429121,47	5,85	89,22	4,92	0,00	95,08	4,92	1,86	1,36	-0,19	1,30	1,99																		
	150-200	2	4518321,16	429121,47	1,41	93,82	4,77	0,00	95,23	4,77	2,02	1,26	-0,17	1,02	2,18																		
13	0-50	2	4518319,47	429220,96	0,14	94,30	3,98	1,58	94,44	5,56	1,36	1,55	0,01	0,83	2,92																		
	50-100	2	4518319,47	429220,96	0,70	96,56	2,74	0,00	97,26	2,74	2,81	0,73	-0,16	1,19	2,86																		
	100-150	2	4518319,47	429220,96	3,01	92,28	4,71	0,00	95,29	4,71	2,41	1,15	-0,29	1,56	2,55																		
	150-200	2	4518319,47	429220,96	2,01	93,81	4,18	0,00	95,82	4,18	2,59	0,97	-0,20	1,70	2,62																		

14	0-50	2	4518320,96	429320,39	0,10	95,16	3,83	0,90	95,27	4,73	2,33	1,01	-0,19	1,06	3,02												
	50-100	2	4518320,96	429320,39	1,79	94,27	3,95	0,00	96,05	3,95	1,66	1,28	-0,13	0,86	1,82												
	100-150	2	4518320,96	429320,39	3,22	95,15	1,64	0,00	98,36	1,64	2,06	1,15	-0,20	1,13	2,15												
	150-200	2	4518320,96	429320,39	7,17	88,47	4,37	0,00	95,63	4,37	1,87	1,50	-0,29	1,23	2,15												
15	0-50	2	4518298,73	429405,23	1,17	91,54	6,14	1,15	92,71	7,29	3,00	0,69	0,09	1,26	2,60												
	50-100	2	4518298,73	429405,23	0,90	92,01	6,05	1,03	92,91	7,09	2,28	1,25	0,00	1,53	2,33												
	100-150	2	4518298,73	429405,23	4,76	93,20	2,04	0,00	97,96	2,04	0,95	1,25	0,13	0,97	0,84												
	150-200	2	4518298,73	429405,23	3,73	93,75	2,52	0,00	97,48	2,52	1,11	1,30	0,14	0,96	0,99												
16	0-50	2	4518241,78	428774,47	8,28	89,33	0,00	0,00	97,61	2,39	2,63	0,97	-0,31	1,30	1,29												
	50-100	2	4518241,78	428774,47	0,28	95,41	4,31	0,00	95,69	4,31	2,65	0,68	0,04	1,16	2,65												
	100-150	2	4518241,78	428774,47	0,30	95,15	4,55	0,00	95,45	4,55	2,77	0,64	0,00	1,25	2,78												
17	0-50	2	4518170,56	428970,58	0,88	96,39	0,00	0,00	97,27	2,73	3,05	1,11	0,25	1,68	2,43												
	50-100	2	4518170,56	428970,58	11,98	85,94	2,07	0,00	97,93	2,07	0,81	1,38	-0,09	0,86	0,95												
	100-150	2	4518170,56	428970,58	12,41	85,40	2,19	0,00	97,81	2,19	0,42	1,18	0,03	0,93	0,44												
	150-200	2	4518170,56	428970,58	14,23	83,37	2,40	0,00	97,60	2,40	0,34	1,24	0,10	0,95	0,31												
18	0-50	2	4518171,19	429170,50	0,22	94,12	4,44	1,22	94,34	5,66	1,61	1,42	0,12	1,05	2,96												
	50-100	2	4518171,19	429170,50	0,54	96,18	3,28	0,00	96,72	3,28	2,83	0,75	-0,21	1,40	2,89												
	100-150	2	4518171,19	429170,50	0,84	95,45	3,71	0,00	96,29	3,71	2,82	0,67	-0,03	1,24	2,82												
	150-200	2	4518171,19	429170,50	0,44	96,67	2,88	0,00	97,12	2,88	2,55	0,71	0,07	1,26	2,50												
19	0-50	2	4518171,10	429370,45	0,58	86,57	10,44	2,40	87,15	12,85	2,07	1,62	-0,23	1,40	3,00												
	50-100	2	4518171,10	429370,45	0,00	93,19	6,04	0,76	93,19	6,81	3,06	0,61	0,17	1,14	2,99												
	100-150	2	4518171,10	429370,45	1,97	94,99	3,04	0,00	96,96	3,04	2,17	1,02	0,09	1,33	2,04												
	150-200	2	4518171,10	429370,45	0,72	94,68	4,60	0,00	95,40	4,60	2,66	0,84	-0,14	1,38	2,71												
20	0-50	2	4518176,73	429548,18	3,98	90,95	3,84	1,23	94,92	5,08	1,25	1,16	-0,01	0,86	1,46												
	50-100	2	4518176,73	429548,18	0,70	92,10	5,71	1,48	92,81	7,19	2,82	1,01	0,10	1,51	2,80												
	100-150	2	4518176,73	429548,18	3,81	92,58	3,62	0,00	96,38	3,62	2,12	1,42	-0,44	1,03	2,57												
	150-200	2	4518176,73	429548,18	1,27	95,28	3,45	0,00	96,55	3,45	2,22	1,18	-0,30	1,15	2,47												
21	0-50	2	4517939,52	428771,41	8,04	85,38	5,18	1,40	93,42	6,58	2,96	0,97	0,14	1,53	2,31												
22	0-50	2	4517971,43	428971,19	0,78	90,64	7,11	1,47	91,42	8,58	2,64	0,96	-0,03	1,36	2,94												
	50-100	2	4517971,43	428971,19	0,18	95,05	4,78	0,00	95,22	4,78	2,88	0,69	-0,13	1,18	2,94												
	100-150	2	4517971,43	428971,19	0,13	95,33	4,55	0,00	95,45	4,55	2,91	0,67	0,03	1,12	2,88												
	150-200	2	4517971,43	428971,19	0,29	93,63	4,82	1,27	93,92	6,08	2,69	0,91	0,02	1,16	2,70												
23	0-50	2	4518046,01	429096,45	1,67	91,97	5,41	0,94	93,65	6,35	2,85	0,93	0,18	1,88	2,68	2	4	2	1	23	3	22	5	6	2	3	27
	50-100	2	4518046,01	429096,45	4,86	51,91	33,44	9,79	56,77	43,23	3,98	2,90	0,12	1,17	3,67	2	4	4	2	10	3	16	2	5		4	48
	100-150	2	4518046,01	429096,45	3,83	90,50	4,92	0,75	94,33	5,67	2,26	1,30	-0,22	1,49	2,40												
	150-200	2	4518046,01	429096,45	1,32	94,94	3,74	0,00	96,26	3,74	2,87	0,67	-0,15	1,23	2,92												
24	0-50	2	4518046,10	429146,42	0,44	91,16	6,79	1,62	91,59	8,41	3,05	0,86	0,09	1,50	2,86												
	50-100	2	4518046,10	429146,42	0,53	94,66	4,78	0,00	95,20	4,78	2,75	0,68	0,01	1,31	2,75												

	100-150	2	4518046,10	429146,42	0,43	95,89	3,68	0,00	96,32	3,68	2,68	0,73	-0,05	1,23	2,69
	150-200	2	4518046,10	429146,42	0,40	94,76	4,84	0,00	95,16	4,84	2,81	0,76	-0,17	1,18	2,88
25	0-50	2	4517970,63	429170,72	0,06	90,87	7,59	1,48	90,93	9,07	3,54	1,19	0,35	1,85	3,05
	50-100	2	4517970,63	429170,72	0,01	94,08	5,13	0,77	94,09	5,91	2,86	0,81	-0,07	1,15	2,90
	100-150	2	4517970,63	429170,72	1,04	91,99	5,70	1,27	93,03	6,97	2,90	0,92	-0,13	1,38	2,97
	150-200	2	4517970,63	429170,72	0,25	97,94	1,81	0,00	98,19	1,81	2,41	0,79	-0,10	1,14	2,45
	200-300	2	4517970,63	429170,72	1,29	95,13	3,58	0,00	96,42	3,58	2,13	1,08	-0,14	1,18	2,22
26	0-50	2	4518045,25	429345,60	0,16	81,98	13,24	4,62	82,14	17,86	3,14	1,49	0,37	2,10	2,98
	50-100	2	4518045,25	429345,60	0,61	79,36	15,65	4,38	79,97	20,03	3,26	1,65	0,36	1,99	3,00
	100-150	2	4518045,25	429345,60	1,53	86,79	8,40	3,28	88,32	11,68	2,97	1,29	0,18	2,19	2,98
	150-200	2	4518045,25	429346,60	1,62	72,23	21,94	4,20	73,85	26,15	3,66	1,81	0,36	1,78	3,25
	200-300	2	4518045,25	429345,60	0,16	83,63	11,86	4,35	83,79	16,21	3,28	1,22	0,40	2,22	3,19
27	0-50	2	4518045,81	429395,93	0,00	87,96	9,75	2,29	87,96	12,04	3,13	1,03	0,26	1,76	3,09
	50-100	2	4518045,81	429395,93	0,41	62,54	27,16	9,89	62,95	37,05	4,29	2,14	0,54	1,20	3,55
	100-150	2	4518045,81	429395,93	1,36	65,64	24,31	8,69	67,00	33,00	4,18	2,30	0,41	1,46	3,46
	150-200	2	4518045,81	429395,93	0,45	81,82	13,52	4,21	82,27	17,73	3,31	1,36	0,39	2,24	3,15
	200-300	2	4518045,81	429395,93	3,28	91,37	4,17	1,18	94,64	5,36	2,24	1,49	-0,43	1,13	2,72
28	0-50	2	4517955,44	429385,19	2,85	70,47	17,60	9,09	73,32	26,68	3,05	1,71	-0,01	2,35	3,22
	50-100	2	4517955,44	429385,19	10,46	74,34	11,78	3,42	84,80	15,20	2,26	2,27	-0,18	1,92	2,80
	100-150	2	4517955,44	429385,19	0,89	96,11	3,00	0,00	97,00	3,00	2,71	0,75	-0,09	1,29	2,73
	150-200	2	4517955,44	429385,19	0,88	97,75	1,36	0,00	98,64	1,36	2,68	0,64	-0,12	1,27	2,72
	200-300	2	4517955,44	429385,19	1,50	95,84	2,66	0,00	97,34	2,66	2,48	1,04	-0,31	1,39	2,65
	300-400	2	4517955,44	429385,19	6,40	90,78	2,83	0,00	97,17	2,83	1,39	1,57	-0,10	0,79	1,52
29	0-50	2	4518038,81	429501,60	0,66	81,13	13,48	4,72	81,80	18,20	3,38	0,87	0,13	1,98	3,20
	50-100	2	4518038,81	429501,60	1,22	94,45	4,33	0,00	95,67	4,33	2,61	0,97	-0,20	1,29	2,69
	100-150	2	4518038,81	429501,60	9,98	87,74	2,28	0,00	97,72	2,28	1,68	1,51	-0,47	1,10	2,18
	150-200	2	4518038,81	429501,60	2,34	92,82	4,84	0,00	95,16	4,84	2,63	0,99	-0,25	1,42	2,73
	200-300	2	4518038,81	429501,60	0,29	92,75	5,05	1,90	93,05	6,95	3,01	0,87	0,08	1,84	3,03
30	0-50	2	4518046,50	429546,53	4,33	91,42	4,25	0,00	95,75	4,25	3,97	2,48	0,39	2,18	2,71
	50-100	2	4518046,50	429546,53	0,89	96,17	2,94	0,00	97,06	2,94	2,31	1,02	-0,17	1,10	2,40
	100-150	2	4518046,50	429546,53	6,29	91,67	2,04	0,00	97,96	2,04	1,80	1,39	-0,39	1,11	2,14
	150-200	2	4518046,50	429546,53	2,92	94,55	2,53	0,00	97,47	2,53	2,51	1,05	-0,31	1,52	2,64
	200-300	2	4518046,50	429546,53	0,23	91,71	5,94	2,12	91,94	8,06	2,91	1,03	0,32	2,17	2,85
31	0-50	2	4517991,68	429489,06	1,35	82,44	12,20	4,02	83,79	16,21	3,21	0,78	0,03	1,57	3,23
	50-100	2	4517991,68	429489,06	0,11	95,70	4,19	0,00	95,81	4,19	2,86	0,67	-0,04	1,21	2,87
	100-150	2	4517991,68	429489,06	1,53	95,45	3,03	0,00	96,97	3,03	2,50	0,91	-0,23	1,49	2,59
	150-200	2	4517991,68	429489,06	0,49	96,19	3,32	0,00	96,68	3,32	2,45	0,88	-0,17	1,19	2,52
	200-300	2	4517991,68	429489,06	0,00	93,98	4,54	1,48	93,98	6,02	2,75	0,97	-0,03	1,52	2,78
	200-300Red	2	4517991,68	429489,06	4,50	86,84	5,73	2,92	91,35	8,65	2,18	1,80	-0,01	1,67	2,33

	0-50	2	4517997,03	429545,88	0,95	88,76	8,32	1,97	89,71	10,29	3,23	0,95	0,03	1,61	3,20												
	50-100	2	4517997,03	429545,88	0,80	95,27	3,93	0,00	96,07	3,93	2,57	1,03	-0,23	1,25	2,67												
32	100-150	2	4517997,03	429545,88	3,22	95,16	1,62	0,00	98,38	1,62	2,34	1,11	-0,35	1,45	2,50												
	150-200	2	4517997,03	429545,88	1,25	94,52	4,23	0,00	95,77	4,23	2,54	0,89	-0,17	1,22	2,62												
	200-300	2	4517997,03	429545,88	0,12	91,71	6,12	2,05	91,83	8,17	3,01	1,00	0,12	1,80	3,06												
	200-300Red	2	4517997,03	429545,88	8,51	82,11	6,89	2,49	90,62	9,38	1,10	1,76	0,17	2,30	1,14												
	0-50	2	4517945,85	429496,14	0,42	78,22	18,51	2,86	78,63	21,37	3,36	1,72	0,27	2,14	3,37	2	4	1	1	25	2	22	5	7	4	3	24
	50-100	2	4517945,85	429496,14	0,10	96,46	3,44	0,00	96,56	3,44	2,73	0,77	-0,06	1,09	2,74	2	5	1	1	29	2	23	5	9	1	1	21
33	100-150	2	4517945,85	429496,14	9,32	88,07	2,61	0,00	97,39	2,61	1,77	1,55	-0,48	1,04	2,32	2	4	1	1	25	2	20	5	7	2	1	30
	150-200	2	4517945,85	429496,14	3,86	94,06	2,08	0,00	97,92	2,08	2,24	1,10	-0,36	1,45	2,43	2	4	1	1	25	3	20	5	7	2	1	29
	200-300	2	4517945,85	429496,14	2,12	94,49	3,39	0,00	96,61	3,39	1,87	1,35	-0,18	0,90	2,04	2	4	1	1	29	3	24	5	8	2	1	20
	0-50	2	4517946,82	429547,52	2,90	79,57	13,81	3,72	82,46	17,54	2,57	0,78	-0,08	1,40	3,19												
	50-100	2	4517946,82	429547,52	2,19	89,09	7,52	1,19	91,29	8,71	2,64	1,25	-0,13	1,34	2,74												
34	100-150	2	4517946,82	429547,52	6,32	91,42	2,27	0,00	97,73	2,27	2,15	1,27	-0,37	1,55	2,37												
	150-200	2	4517946,82	429547,52	0,86	93,28	4,52	1,33	94,14	5,86	2,40	1,02	0,03	1,40	2,40												
	200-300	2	4517946,82	429547,52	1,32	94,28	4,40	0,00	95,60	4,40	1,62	1,01	0,05	1,48	1,63												
	0-50	2	4517896,37	429494,79	2,24	84,18	11,20	2,38	86,42	13,58	2,79	0,79	-0,05	1,16	3,40												
	50-100	2	4517896,37	429494,79	0,24	91,64	6,92	1,20	91,88	8,12	3,06	0,85	0,07	1,30	3,06												
35	100-150	2	4517896,37	429494,79	0,39	95,77	3,84	0,00	96,16	3,84	2,67	0,82	-0,08	1,15	2,69												
	150-200	2	4517896,37	429494,79	1,54	95,67	2,78	0,00	97,22	2,78	2,32	1,07	-0,32	1,32	2,49												
	200-300	2	4517896,37	429494,79	2,64	93,54	3,82	0,00	96,18	3,82	1,79	1,38	-0,14	0,94	1,93												
	300-400	2	4517896,37	429494,79	3,84	94,20	1,95	0,00	98,05	1,95	1,01	0,95	-0,14	1,28	1,09												
	0-50	2	4517896,87	429545,63	0,97	90,94	6,70	1,40	91,91	8,09	1,48	1,85	-0,46	0,77	3,23												
36	50-100	2	4517896,87	429545,63	7,39	85,01	6,04	1,57	92,40	7,60	2,24	1,61	-0,17	1,81	2,44												
	100-150	2	4517896,87	429545,63	9,59	88,78	1,63	0,00	98,37	1,63	1,75	1,42	-0,46	1,24	2,19												
	150-200	2	4517896,87	429545,63	2,82	92,89	4,29	0,00	95,71	4,29	2,11	1,22	-0,16	1,10	2,21												
	0-50	2	4517972,22	429610,64	2,82	92,89	4,29	0,00	95,71	4,29	3,32	1,21	0,09	2,16	3,27	2	4	1	1	24	2	20	4	10	2	9	21
37	50-100	2	4517972,22	429610,64	7,92	91,16	0,92	0,00	99,08	0,92	1,74	1,46	-0,40	1,06	2,12	1	5	1	1	28	2	26	6	12	2	1	15
	100-150	2	4517972,22	429610,64	3,09	94,71	2,20	0,00	97,80	2,20	2,07	1,02	-0,21	1,34	2,15												
	150-200	2	4517972,22	429610,64	1,14	93,47	4,29	1,10	94,62	5,38	2,09	1,32	-0,20	0,98	2,33												
	0-50	2	4517771,07	428770,88	0,30	78,85	16,02	4,83	79,15	20,85	3,98	1,51	0,44	1,34	3,20												
38	50-100	2	4517771,07	428770,88	3,28	76,67	15,79	4,26	79,95	20,05	3,02	1,89	0,21	1,60	2,88												
	100-150	2	4517771,07	428770,88	0,93	89,31	7,99	1,76	90,24	9,76	2,22	1,26	0,36	1,64	2,01												
	150-200	2	4517771,07	428770,88	0,69	94,71	4,60	0,00	95,40	4,60	2,07	0,86	0,11	1,46	2,04												
39	0-50	2	4517820,47	428920,84	2,12	93,70	0,00	0,00	95,82	4,18	3,30	1,42	0,32	2,20	2,59												
40	0-50	2	4517820,84	429020,72	1,07	93,74	3,93	1,25	94,82	5,18	2,57	1,21	-0,34	1,68	2,80												
41	0-50	2	4517829,56	429113,60	16,87	79,88	0,00	0,00	96,76	3,24	3,26	1,26	0,26	2,24	2,24												
	0-50	2	4517771,06	429270,53	0,81	69,76	26,64	2,80	70,56	29,44	5,05	2,06	0,40	1,09	3,55												

42	50-100	2	4517771,06	429270,53	0,28	49,59	40,48	9,66	49,86	50,14	4,69	2,03	0,49	0,94	4,01
	100-150	2	4517771,06	429270,53	1,39	45,56	44,44	8,60	46,96	53,04	4,56	1,96	0,35	1,47	4,13
	150-200	2	4517771,06	429270,53	0,14	41,23	48,54	10,10	41,36	58,64	4,82	1,83	0,46	1,26	4,34
	200-300	2	4517771,06	429270,53	0,56	59,06	35,37	5,01	59,62	40,38	4,10	1,72	0,35	1,34	3,76
	300-400	2	4517771,06	429270,53	0,21	95,25	4,54	0,00	95,46	4,54	2,59	0,98	-0,11	0,93	2,64
43	0-50	2	4517770,14	429470,21	1,09	65,46	25,90	7,55	66,55	33,45	4,40	2,01	0,37	1,70	3,65
	50-100	2	4517770,14	429470,21	1,92	61,33	30,45	6,30	63,25	36,75	4,14	1,65	0,45	1,59	3,76
	100-150	2	4517770,14	429470,21	1,32	72,94	21,48	4,26	74,26	25,74	3,76	1,29	0,40	2,21	3,60
	150-200	2	4517770,14	429470,21	0,22	85,60	11,31	2,87	85,82	14,18	3,21	1,01	0,40	1,89	3,10
	200-300	2	4517770,14	429470,21	4,65	91,47	3,87	0,00	96,13	3,87	1,77	1,49	-0,12	0,93	1,86
	300-400	2	4517770,14	429470,21	10,93	86,61	2,45	0,00	97,55	2,45	0,75	1,36	-0,04	0,94	0,86
44	0-50	2	4517771,21	429668,34	2,67	81,09	13,60	2,63	83,76	16,24	3,10	1,36	0,20	2,34	3,36
	50-100	2	4517771,21	429668,34	0,96	92,79	5,30	0,95	93,75	6,25	2,75	0,85	0,06	1,47	2,74
	100-150	2	4517771,21	429668,34	3,78	94,05	2,17	0,00	97,83	2,17	2,11	1,13	-0,35	1,49	2,32
	150-200	2	4517771,21	429668,34	0,48	96,49	3,04	0,00	96,96	3,04	2,22	0,87	-0,11	1,30	2,29
45	0-50	2	4517570,91	428571,08	1,19	37,81	48,86	12,14	39,00	61,00	2,91	1,75	-0,11	2,44	4,50
	50-100	2	4517570,91	428571,08	1,85	36,97	49,43	11,74	38,83	61,17	5,03	2,09	0,35	1,15	4,52
	100-150	2	4517570,91	428571,08	0,21	69,86	25,15	4,78	70,06	29,94	3,88	1,30	0,49	1,96	3,63
	150-200	2	4517570,91	428571,08	0,57	80,78	15,35	3,31	81,34	18,66	3,58	1,05	0,38	2,31	3,49
46	0-50	2	4517569,77	428769,13	3,29	52,59	36,29	7,83	55,88	44,12	3,23	3,30	-0,02	1,06	3,87
	50-100	2	4517569,77	428769,13	0,27	76,50	18,78	4,45	76,77	23,23	3,70	1,21	0,54	2,49	3,47
	100-150	2	4517569,77	428769,13	3,84	84,08	10,72	1,37	87,92	12,08	3,35	1,00	-0,23	2,41	3,44
	150-200	2	4517569,77	428769,13	0,28	91,36	7,12	1,24	91,64	8,36	3,28	0,65	0,08	1,51	3,28
47	0-50	2	4517671,19	428970,56	0,28	91,36	7,12	1,24	91,64	8,36	4,18	1,92	0,45	1,72	3,07
	50-100	2	4517671,19	428970,56	0,28	91,36	7,12	1,24	91,64	8,36	2,77	1,39	-0,01	1,41	2,91
	100-150	2	4517671,19	428970,56	0,28	86,68	10,55	2,49	86,96	13,04	2,82	1,42	0,20	1,59	2,81
	150-200	2	4517671,19	428970,56	0,60	94,80	4,60	0,00	95,40	4,60	2,50	0,82	-0,02	1,32	2,52
48	0-50	2	4517721,02	429120,60	7,18	78,05	12,03	2,74	85,23	14,77	3,18	0,92	0,08	1,66	3,03
	50-100	2	4517721,02	429120,60	3,22	58,12	31,14	7,52	61,34	38,66	4,03	2,31	0,19	1,78	3,68
	100-150	2	4517721,02	429120,60	4,92	62,08	27,96	5,04	67,00	33,00	3,69	2,17	0,10	1,91	3,49
	150-200	2	4517721,02	429120,60	0,34	95,06	4,61	0,00	95,39	4,61	2,72	0,85	-0,08	1,04	2,74
49	0-50	2	4517545,96	428895,98	12,56	51,24	27,32	8,88	63,80	36,20	3,38	3,49	-0,05	1,03	3,48
	50-100	2	4517545,96	428895,98	0,95	19,37	59,55	20,13	20,32	79,68	5,94	2,28	0,18	0,93	5,63
	100-150	2	4517545,96	428895,98	3,34	39,32	46,31	11,03	42,66	57,34	4,90	2,25	0,30	1,35	4,33
	150-200	2	4517545,96	428895,98	0,11	52,84	38,48	8,58	52,95	47,05	4,52	1,76	0,56	1,27	3,94
50	0-50	2	4517546,24	428945,82	14,36	43,12	32,06	10,47	57,48	42,52	1,84	1,31	-0,24	0,84	3,69
	50-100	2	4517546,24	428945,82	7,68	40,81	40,97	10,54	48,48	51,52	4,37	2,80	0,07	1,56	4,08
	100-150	2	4517546,24	428945,82	1,46	62,21	29,70	6,63	63,67	36,33	4,15	1,73	0,46	1,66	3,69
	150-200	2	4517546,24	428945,82	1,34	83,96	10,86	3,85	85,30	14,70	2,85	1,62	0,06	1,77	2,97

51	0-50	2	4517546,03	428995,54	5,66	54,07	33,26	7,00	59,73	40,27	3,85	2,65	0,06	1,52	3,69												
	50-100	2	4517546,03	428995,54	9,06	55,04	28,32	7,58	64,10	35,90	3,56	2,91	0,04	1,42	3,51												
	100-150	2	4517546,03	428995,54	1,64	77,06	16,86	4,44	78,70	21,30	3,22	1,74	0,34	1,56	3,00												
52	0-50	2	4517546,52	429045,81	0,60	43,61	42,83	12,96	44,21	55,79	5,03	2,21	0,39	0,92	4,42	4	3	5	1	7	3	6	2	3	1	6	59
	50-100	2	4517546,52	429045,81	5,82	43,44	39,89	10,85	49,26	50,74	4,50	2,79	0,13	1,31	4,05	4	3	6	2	8	3	7	2	5	1	4	55
	100-150	2	4517546,52	429045,81	2,74	80,12	13,11	4,02	82,87	17,13	3,31	1,48	0,20	2,88	3,20	2	4	2	1	17	4	12	6	5	2	1	44
	150-200	2	4517546,52	429045,81	0,34	71,98	23,52	4,16	72,31	27,69	4,50	2,79	0,13	1,31	4,05												
53	0-50	2	4517496,19	428895,49	4,59	36,48	46,90	12,02	41,07	58,93	4,84	2,74	0,07	1,35	4,52												
	50-100	2	4517496,19	428895,49	2,14	55,38	35,07	7,41	57,52	42,48	4,35	2,03	0,33	1,73	3,84												
	100-150	2	4517496,19	428895,49	0,00	82,04	15,09	2,87	82,04	17,96	3,50	0,94	0,36	2,06	3,43												
	150-200	2	4517496,19	428895,49	0,00	82,04	15,09	2,87	82,04	17,96	3,56	1,18	0,47	2,19	3,38												
54	0-50	2	4517496,39	428946,18	1,72	29,93	53,68	14,67	31,65	68,35	5,37	2,38	0,14	1,04	5,10												
	50-100	2	4517496,39	428946,18	2,71	32,75	51,83	12,71	35,45	64,55	5,14	2,46	0,16	1,28	4,68												
	100-150	2	4517496,39	428946,18	1,58	32,72	53,87	11,84	34,30	65,70	5,08	2,20	0,25	1,31	4,64												
	150-200	2	4517496,39	428946,18	0,25	44,83	45,94	8,98	45,08	54,92	4,70	1,74	0,50	1,32	4,20												
55	0-50	2	4517494,12	428995,89	0,95	38,64	47,27	13,15	39,59	60,41	5,13	2,34	0,20	0,86	4,73												
	50-100	2	4517494,12	428995,89	0,55	24,84	56,34	18,28	25,38	74,62	5,71	2,25	0,29	0,90	5,26												
	100-150	2	4517494,12	428995,89	0,39	38,77	49,05	11,79	39,16	60,84	5,06	2,18	0,28	0,95	4,60												
	150-200	2	4517494,12	428995,89	4,63	41,70	43,02	10,66	46,33	53,67	4,56	2,63	0,12	1,56	4,20												
56	0-50	2	4517495,67	429045,45	4,63	41,70	43,02	10,66	46,33	53,67	4,48	2,42	0,30	1,35	3,88												
	50-100	2	4517495,67	429045,45	1,62	53,59	35,86	8,94	55,21	44,79	4,51	1,97	0,47	1,40	3,89												
	100-150	2	4517495,67	429045,45	2,48	60,08	30,93	6,51	62,57	37,43	3,96	2,36	0,21	1,30	3,59												
	150-200	2	4517495,67	429045,45	5,80	64,39	23,97	5,84	70,19	29,81	3,03	2,85	0,05	1,02	3,05												
57	0-50	2	4517571,19	429170,71	10,25	55,05	28,09	6,61	65,30	34,70	3,62	2,63	0,03	1,84	3,54												
	50-100	2	4517571,19	429170,71	7,80	53,13	30,16	8,92	60,93	39,07	4,30	2,63	0,24	1,38	3,64												
	100-150	2	4517571,19	429170,71	2,91	83,96	9,82	3,32	86,86	13,14	3,20	1,21	0,23	2,77	3,16												
	150-200	2	4517571,19	429170,71	0,77	77,85	16,57	4,82	78,62	21,38	3,58	1,43	0,41	2,42	3,36												
58	0-50	2	4517571,27	429370,46	0,17	44,75	45,14	9,94	44,92	55,08	4,83	1,88	0,49	1,19	4,23												
	50-100	2	4517571,27	429370,46	8,70	76,05	12,95	2,31	84,75	15,25	2,49	1,95	-0,17	1,79	2,79												
	100-150	2	4517571,27	429370,46	9,59	85,98	4,43	0,00	95,57	4,43	2,12	1,54	-0,48	1,43	2,60												
	150-200	2	4517571,27	429370,46	0,10	81,50	13,91	4,49	81,60	18,40	3,37	1,42	0,32	2,17	3,26												
59	0-50	2	4517570,61	429570,50	1,02	89,65	7,93	1,39	90,67	9,33	3,23	0,71	0,10	1,33	3,22												
	50-100	2	4517570,61	429570,50	0,06	92,78	5,41	1,76	92,84	7,16	3,13	0,69	0,18	1,54	3,10												
	100-150	2	4517570,61	429570,50	0,08	95,40	3,90	0,62	95,48	4,52	2,86	0,64	0,06	1,23	2,83												
	150-200	2	4517570,61	429570,50	0,43	88,77	8,55	2,24	89,21	10,79	3,00	1,00	0,31	2,19	2,92												
60	0-50	2	4517545,95	429695,52	0,00	87,71	9,49	2,79	87,71	12,29	3,33	0,82	0,30	1,92	3,31												
	50-100	2	4517545,95	429695,52	0,00	93,76	4,91	1,33	93,76	6,24	3,12	0,61	0,15	1,15	3,07												
	100-150	2	4517545,95	429695,52	0,10	95,87	3,05	0,98	95,97	4,03	2,97	0,59	-0,02	1,25	2,96												

	150-200	2	4517545,95	429695,52	0,46	97,22	2,31	0,00	97,69	2,31	2,69	0,75	-0,16	1,59	2,72												
61	0-50	2	4517571,63	429770,36	0,29	87,40	10,82	1,49	87,69	12,31	3,32	0,68	0,14	1,27	3,31	2	4	3	1	13	4	9	3	8	2	9	42
	50-100	2	4517571,63	429770,36	1,31	94,09	3,97	0,63	95,40	4,60	2,78	0,69	-0,02	1,28	2,79	1	4	1	1	21	5	14	5	8	6	1	33
	100-150	2	4517571,63	429770,36	0,00	96,89	3,11	0,00	96,89	3,11	2,89	0,50	0,08	1,17	2,86	1	4	1	1	21	5	13	6	9	6	1	32
	150-200	2	4517571,63	429770,36	0,04	93,06	5,39	1,51	93,11	6,89	2,86	0,71	0,30	1,80	2,81	1	4	1	1	21	4	13	6	8	7	-	34
62	0-50	2	4517521,66	429971,64	1,93	93,11	4,96	0,00	95,04	4,96	2,75	0,89	-0,18	1,71	2,77												
63	0-50	2	4517526,78	430168,91	2,45	95,26	2,29	0,00	97,71	2,29	2,65	0,82	-0,25	1,72	2,70												
64	0-50	2	4517369,43	428571,67	0,96	33,47	53,25	12,32	34,43	65,57	5,16	1,96	0,43	1,10	4,62												
64bis	0-50	2	4517369,71	428571,90	0,07	38,81	49,63	11,48	38,89	61,11	5,00	1,92	0,46	1,12	4,47												
	50-100	2	4517369,71	428571,90	1,13	64,16	28,26	6,46	65,28	34,72	4,23	1,53	0,55	2,03	3,79												
	100-150	2	4517369,71	428571,90	0,23	57,34	35,40	7,02	57,57	42,43	4,34	1,53	0,57	1,79	3,89												
	150-200	2	4517369,71	428571,90	0,00	43,59	46,79	9,62	43,59	56,41	4,81	1,68	0,59	1,35	4,23												
65	0-50	2	4517370,90	428770,87	8,38	29,19	48,52	13,91	37,57	62,43	5,00	2,86	0,07	1,44	4,63												
	50-100	2	4517370,90	428770,87	3,17	30,79	55,59	10,46	33,95	66,05	4,97	2,47	0,03	1,39	4,77												
	100-150	2	4517370,90	428770,87	0,19	63,45	33,81	2,55	63,64	36,36	3,93	1,16	0,28	1,46	3,75												
	150-200	2	4517370,90	428770,87	0,38	80,19	15,28	4,15	80,57	19,43	3,62	1,11	0,43	2,59	3,50												
66	0-50	2	4517372,03	428970,35	3,96	26,26	54,27	15,50	30,23	69,77	5,47	2,53	0,09	1,17	5,18												
	50-100	2	4517372,03	428970,35	3,54	29,41	54,54	12,51	32,95	67,05	5,18	2,50	0,13	1,41	4,74												
67	0-50	2	4517363,93	429171,70	11,32	57,23	24,57	6,87	68,56	31,44	3,05	3,14	-0,02	1,05	3,28												
68	0-50	2	4517370,71	429370,50	3,56	70,17	21,38	4,89	73,74	26,26	3,50	2,00	0,08	2,38	3,42												
	50-100	2	4517370,71	429370,50	2,86	73,50	19,50	4,14	76,36	23,64	3,50	1,61	0,13	2,28	3,45												
	100-150	2	4517370,71	429370,50	0,15	85,24	12,12	2,48	85,39	14,61	3,17	1,04	0,22	1,55	3,15												
	150-200	2	4517370,71	429370,50	2,81	83,47	12,02	1,70	86,28	13,72	2,93	1,29	0,05	1,86	2,93												
69	0-50	2	4517373,10	429559,19	4,56	88,99	5,17	1,28	93,55	6,45	2,96	1,16	-0,17	2,41	2,93												
	50-100	2	4517373,10	429559,19	0,12	95,28	4,60	0,00	95,40	4,60	2,94	0,60	0,17	1,03	2,86												
	100-150	2	4517373,10	429559,19	0,10	95,80	4,10	0,00	95,90	4,10	2,76	0,66	0,01	1,18	2,76												
	150-200	2	4517373,10	429559,19	0,62	95,32	4,06	0,00	95,94	4,06	2,78	0,68	-0,06	1,25	2,80												
70	0-50	2	4517371,06	429770,64	0,34	95,58	4,09	0,00	95,91	4,09	3,02	0,54	-0,04	1,10	3,03												
71	0-50	2	4517320,89	429970,87	0,73	95,36	3,92	0,00	96,08	3,92	2,55	0,86	-0,19	1,62	2,62												
72	0-50	2	4517319,31	430170,89	3,25	95,50	1,25	0,00	98,75	1,25	2,59	0,85	-0,32	1,72	2,66												
73	0-50	2	4517220,70	428721,48	6,27	32,47	46,14	15,12	38,73	61,27	4,77	3,17	-0,05	1,17	4,76												
	50-100	2	4517220,70	428721,48	11,76	35,75	43,13	9,35	47,51	52,49	3,58	3,40	-0,16	0,80	4,19												
	100-150	2	4517220,70	428721,48	0,26	43,63	47,26	8,85	43,89	56,11	4,69	1,71	0,49	1,41	4,22												
	150-200	2	4517220,70	428721,48	0,56	73,99	20,90	4,54	74,56	25,45	3,82	1,20	0,44	2,68	3,66												
74	0-50	2	4517220,64	428821,56	7,89	45,27	35,29	11,54	53,17	46,83	3,98	3,17	0,02	1,41	3,91												
75	0-50	2	4517221,23	428920,91	8,36	49,82	32,05	9,76	58,19	41,81	3,81	2,96	0,03	1,64	3,75												
	50-100	2	4517221,23	428920,91	12,22	56,85	24,94	5,99	69,07	30,93	2,72	3,07	-0,01	0,89	3,00												
77	0-50	2	4517219,52	429119,88	20,44	76,00	3,56	0,00	96,44	3,56	0,35	1,51	0,25	0,93	0,20												

77bis	0-50	2	4517220,92	429120,24	15,81	74,95	7,66	1,59	90,76	9,24	1,23	2,14	0,05	1,06	1,41										
80	0-50	2	4517170,61	429571,10	11,77	66,78	17,18	4,27	78,56	21,44	2,48	2,57	-0,27	1,49	3,31										
81	0-50	2	4517171,01	429772,45	1,33	94,22	4,45	0,00	95,55	4,45	2,39	0,90	-0,19	1,68	2,47										
82	0-50	2	4517121,06	429970,98	0,88	96,56	2,56	0,00	97,44	2,56	2,41	0,72	-0,13	1,28	2,47										
83	0-50	2	4517125,31	430169,57	17,81	78,76	3,43	0,00	96,57	3,43	1,26	1,74	-0,43	0,87	1,95										
84bis	0-50	2	4517076,76	429018,47	22,46	69,28	6,96	1,30	91,74	8,26	1,06	2,15	0,07	0,87	1,24										
85	0-50	2	4516974,19	429368,90	17,13	74,85	6,03	1,99	91,98	8,02	1,36	2,18	-0,12	1,07	1,89										
90bis	0-50	2	4516980,35	429338,04	21,01	76,61	2,37	0,00	97,63	2,37	0,80	1,60	-0,14	0,71	1,07										
91	0-50	2	4516920,60	429970,99	0,75	79,12	17,10	3,03	79,87	20,13	3,35	1,45	0,41	1,84	3,07										
92	0-50	2	4516938,37	430161,64	1,06	95,64	3,30	0,00	96,70	3,30	2,47	0,89	-0,24	1,35	2,58										
94	0-50	2	4516753,38	429763,74	2,67	82,64	11,48	3,21	85,31	14,69	2,52	1,72	0,07	1,30	2,55										
95	0-50	2	4516720,48	429970,24	2,33	73,43	20,76	3,48	75,76	24,24	3,36	1,89	0,26	1,51	3,04										
96	sur. sed.	1	4519003,80	425983,19	0,40	99,19	0,41	0,00	99,59	0,41	2,58	0,57	-0,25	1,36	2,64	6		22	2	67		3	x		
97	sur. sed.	1	4518613,44	426223,88	2,18	97,69	0,13	0,00	99,87	0,13	1,11	1,00	0,10	0,89	1,02										
98	sur. sed.	1	4518992,48	426560,81	0,36	99,46	0,18	0,00	99,82	0,18	1,83	0,82	-0,05	0,89	1,82	16			3	78		3	x		
99	sur. sed.	1	4518829,95	427091,97	4,41	95,56	0,03	0,00	99,97	0,03	0,68	0,84	-0,13	1,06	0,74	3		1	2	81	6	7	x		
100	sur. sed.	1	4518634,59	427577,84	15,40	84,54	0,06	0,00	99,94	0,06	0,20	1,00	-0,15	0,79	0,33										
101	sur. sed.	1	4518721,14	427809,22	19,09	80,82	0,09	0,00	99,91	0,09	-0,07	0,95	0,03	0,85	-0,04	12			1	85		2	x		
102	sur. sed.	1	4518672,95	428198,14	5,74	94,18	0,08	0,00	99,92	0,08	0,59	0,86	-0,21	1,11	0,71										
103	sur. sed.	1	4518638,98	428649,06	0,29	98,76	0,94	0,00	99,06	0,94	2,82	0,58	-0,09	1,31	2,83	35			2	63			x		
104	sur. sed.	1	4518543,25	426150,08	0,45	78,35	17,81	3,38	78,80	21,20	3,66	1,14	0,28	2,64	3,59										
105	sur. sed.	1	4518490,86	426766,70	6,27	84,46	8,01	1,26	90,73	9,27	2,67	1,70	-0,51	2,50	3,29										
106	sur. sed.	1	4518254,73	427256,40	4,13	86,36	8,65	0,86	90,48	9,52	1,93	1,94	-0,22	0,63	2,36										
107	sur. sed.	1	4518068,13	428365,19	55,35	42,05	2,55	0,05	97,40	2,60	-0,05	1,64	0,83	1,46	-1,05	28				45	3	8	x		16
108	sur. sed.	1	4518104,00	426594,16	1,97	70,86	23,90	3,27	72,83	27,17	3,55	1,54	-0,01	2,33	3,62										
109	sur. sed.	1	4517936,59	427433,22	2,81	87,62	8,35	1,22	90,43	9,57	2,49	1,67	-0,43	1,07	3,07										
110	sur. sed.	1	4518088,12	427831,16	0,33	92,04	6,71	0,92	92,37	7,63	3,40	0,53	0,03	1,17	3,40										
111	sur. sed.	3	4517601,29	426537,15	2,02	55,09	35,47	7,41	57,12	42,88	4,26	2,11	0,29	1,50	3,83										
112	sur. sed.	3	4517619,52	428069,81	1,57	57,87	31,80	8,76	59,43	40,57	4,48	2,12	0,41	1,69	3,82	27		9	8	47	3	3	x		3
113	sur. sed.	3	4517269,74	427132,82	0,16	28,32	57,29	14,24	28,48	71,52	5,39	1,97	0,47	1,02	4,77										
114	sur. sed.	3	4516636,22	426829,88	0,01	8,97	70,12	20,90	8,98	91,02	6,21	2,00	0,33	0,91	5,78										
115	sur. sed.	3	4516984,19	427759,92	0,66	21,52	60,67	17,16	22,17	77,83	5,69	2,10	0,40	0,96	5,12										
116	sur. sed.	3	4516874,09	428426,74	8,33	38,98	44,32	8,36	47,31	52,69	4,21	2,76	-0,02	1,37	4,17	33	13	13	6	7	3		x	21	4
117	sur. sed.	3	4516341,34	427462,56	2,28	36,80	50,14	10,78	39,08	60,92	4,80	2,32	0,11	1,18	4,65										
118	sur. sed.	3	4515702,25	427160,97	0,79	16,39	59,76	23,05	17,19	82,81	6,13	2,29	0,19	0,89	5,79										
119	sur. sed.	3	4516050,10	428107,99	0,39	29,51	52,96	17,14	29,91	70,09	5,46	2,38	0,28	0,98	4,96										
120	sur. sed.	4	4515696,44	428707,85	3,98	94,38	0,00	0,00	98,36	1,64	0,99	1,22	0,07	1,10	0,96										

121	sur. sed.	3	4515397,87	427823,19	0,21	18,38	59,81	21,60	18,59	81,41	6,01	2,24	0,27	0,86	5,59							
122	sur. sed.	3	4514740,45	427501,72	0,28	8,60	65,23	25,89	8,89	91,11	6,47	2,07	0,20	0,81	6,19							
123	sur. sed.	4	4515255,59	428949,72	18,30	70,54	7,76	3,40	88,84	11,16	1,21	2,46	0,28	0,92	1,01							
124	sur. sed.	4	4516183,35	430034,38	9,73	90,17	0,10	0,00	99,90	0,10	0,01	0,74	-0,10	1,02	0,06							
125	sur. sed.	4	4516402,74	430314,87	1,67	98,16	0,17	0,00	99,83	0,17	0,90	0,92	0,10	1,17	0,86	23	6	9	55		x	7
126	sur. sed.	4	4515618,93	429847,63	20,41	79,03	0,56	0,00	99,44	0,56	0,11	1,22	0,22	0,89	-0,02							
127	sur. sed.	4	4516046,44	430820,57	0,56	97,56	1,88	0,00	98,12	1,88	2,27	0,96	-0,15	1,04	2,36	74		4	13	10	x	
128	0-50	2	4516973,35	429771,34	0,85	92,05	5,81	1,29	92,90	7,10	2,57	1,04	0,13	1,17	2,51							
129	0-50	2	4516972,71	429572,08	0,27	70,38	22,23	7,13	70,64	29,36	3,99	1,76	0,44	1,97	3,60							
130	0-50	2	4516770,82	429574,64	5,37	81,48	10,15	3,01	86,85	13,15	2,65	1,84	-0,05	1,88	2,76							