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The activity of Italian volcanoes represented in ancient maps and frescoes from Middle Age to Renaissance

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Abstract

We examined ancient maps in manuscripts and in print or frescoes to look for the representation of the state of activity of Italian volcanoes between the Middle Ages and the Renaissance. The first evidence is found in a manuscript of an Arab geographer of the XII century, and in manuscripts of the fifteenth century. The printed maps of the 1500s are influenced by the production of Giacomo Gastaldi who, in our opinion, makes a peculiar error by reporting an activity, probably untrue at Filicudi. This error characterizes many subsequent maps and is finally corrected with the production of maps by authors of the Reign of Naples. The maps reproduced after Gastaldi and the eruption of Vesuvius in 1631 are a reference mark that can be used to date some remakes and corrections of the maps of the Vatican Gallery. We aim to show that the detailed knowledge of the record of activity of Italian volcanoes may help to better trace the origin of some maps and define also the age of restoration of the frescoes of the Vatican Museum.

Keywords: Italian Volcanoes, Etna, Stromboli, Vesuvius, Vulcano, Map, Vatican Museums, Egnatio Danti, Gastaldi

1. Introduction

Volcanic activity has often attracted the attention of people that left memoirs of volcanic eruption in written accounts or paintings.

One of the first maps, the mural painting of Neolithic age in a cave of Catal Huyuk in Turkey, shows the activity of Hasan Dagi volcano 6600 years BC (Schmitt et al., 2014) (Figure 1).

Written accounts of eruptions are reported by Thucydides in his War of the Peloponnesus, mentioning those of Etna in 425 and 475 BC.

The Greek geographer Strabo describes the state of activity of several volcanoes active in the first century CE. He correctly identifies the activity of Etna in Sicily, and Vulcano and Stromboli in the Eolian islands.

Figure 1. The mural of the eruption Hasan Dagi volcano (reprinted after Haydaroglu, 2014).

Further on, he hypothesizes that Vesuvius, dormant at his time, may have been active, like Etna, centuries before. Pliny the Younger provides the first detailed description of an explosive eruption of Vesuvius which caused the death of his uncle Pliny the Older and the destruction of Pompeii and Herculaneum. The activity of Etna afflicted the nearby inhabitants also during the Roman time.

The Geography of Ptolemy (II century CE) only provides the position of Etna without any reference to its activity.

Similarly, the 13th century Peutingerian Table, a copy of a possible roman map of the first century CE, does not show any trace of active or extinct volcanoes although their activity was known.

In the middle age only a few reports of travelers mention eruptions observed during their journey including Vesuvius, Etna, Lipari, Stromboli and Vulcano (Scandone et al., 1993; Keller, 1980; Pichler, 1980; Branca et al., 2015; Branca and Abate, 2019).

Several authors have already discussed this argument (Conti, 2005; D'Aponte, 2005; De Seta, 1982; Valerio, 1996).

In this paper we will analyze ancient maps since the Middle Age to Renaissance which provide evidence of the activity of Italian volcanoes. We will show that, in some cases, the volcanoes have alternated period of quiescence or prolonged activity well displayed in the geographic representation. Further on, the known record of activity provides important clues to the dating of geographical frescoes and paintings.

2. The ancient manuscripts

The first representation of an erupting volcano in a map of Italy appears in the "Book of King Roger" by the Arab geographer El Idrisi which represented in 1154 the known world on a silver circular disk of 2 meters diameter, which was later destroyed in 1160. El Idrisi was the geographer of the king Roger II of Sicily, who commissioned a work describing the world known in his time.

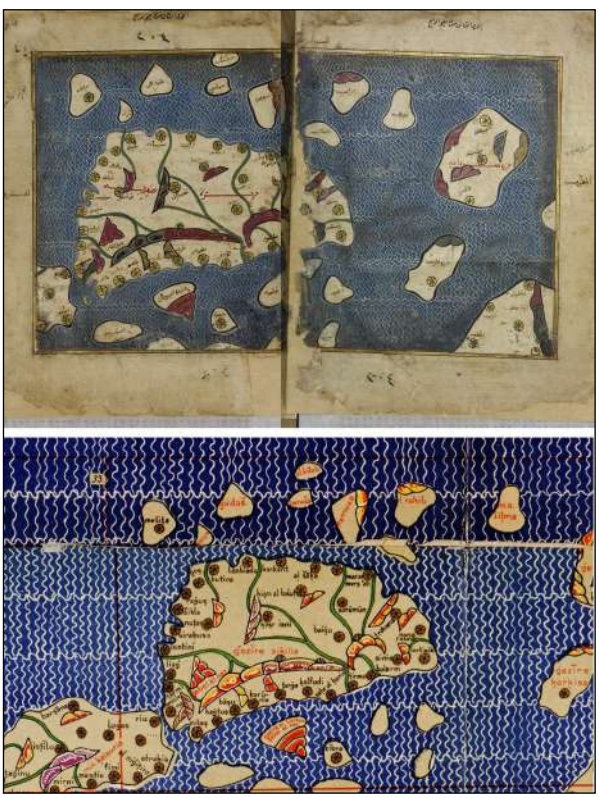

Figure 2. The map of Sicily illustrated in the manuscript of El Idrisi (above). The image has the South in the upper part and the active volcanoes of Etna and Vulcano have a red top. The same image with arab captions translated into Latin by Miller, 1929 (reproduced after manuscript Arabe 2221 Bibliotheche Nationale de France, and Miller, 1929).

The map was also known in Arabic as Kitab Rujar (Roger's book), and in Latin as Tabula Rogeriana. Along with the Tabula, El Idrisi wrote a compendium called "*Nuzhat al-muštāq fī iḫtirāq al-āfāq*" (A Diversion for the Man Longing to Travel to Far-Off Places) still preserved in several manuscripts.

The map of Sicily (Figure 2) shows two volcanoes called Jabal al Nar (Fire Mountain) as Etna and Jabal al Burkan (Vulcano) also called Jabal al Nar.

The map has the South in the upper part and the active volcanoes are represented by cones with a red top. The island of Stromboli (East of Vulcano), not represented in the maps, is said erupting from time to time. There is also the description of a Mountain of Fire (Jabal al Nar) (Vesuvius), between Naples and Stabia, which is a volcano (burkan) where is not possible to get within, because is erupting stone and fire (Amari and Schiapparelli, 1883). The last eruption of Vesuvius at the time of El Idrisi had been that of 1139 (Scandone et al., 1993) followed by a long quiescent period ending in 1631. In the reconstruction of the Tabula Rogeriana of Miller (1929), Vesuvius is erroneously located south of Rome and north of Gaeta.

Maps of Italy are contained in a few Greek manuscripts of the Geography of Ptolemy (Almagià, 1929). The original text of Ptolemy did not contain any maps and the few contained in the manuscripts were probably reconstructed on the basis of the information of the text (Almagià, 1929). These maps (e.g codex Urb. gr. 82). do not contain any sufficient details to infer the status of Italian volcanoes.

In 1397, the Byzantine Scholar Manuel Crisoloras brought a copy of the Geography of Ptolemy to Italy and initiated a translation into Latin which was lately completed by his disciple Jacopo Angeli della Scarperia (Gentile, 2013). The Latin version of Ptolemy geographical work prompted the publication of several maps by European scholars. The first chorographic map reporting the activity of Italian volcanoes is that of Enrico Martello (around 1470) in the Latin Codex Magliabeccano XIII.16 preserved in the National Library of Florence. The map (Figure 3), derived by the Ptolemy manuscript with the addition of orography, represents Italy along an East-West direction, and shows clear evidence of the activity of Etna, Vulcano Island and Stromboli. These volcanoes are drawn with flames on the top. No evidence of activity is reported for Vesuvius or Ischia, quiescent at that time. Enrico Martello also made a map of Sicily in *its Insularium Illustratum* reproduced in manuscript 15760 of the British Library (Figure 4) with the same peculiarities of the one of Italy.

Figure 3. Southern Italy from the Ptolemaic map of Enrico Martello. The activity of Etna, Vulcano and Stromboli is well displayed (reproduced after Borri, 2004).

Figure 4. The representation of Sicily in the *Insularium* of Enrico Martello. Etna is called Mos Gibel, Vulcano is Wlcano, and Stromboli is Strongoli (reproduced from manuscript 15760 of the British Library).

3. The Printed Maps

The invention of mobile printing revolutionized not only the diffusion of new books, but also the diffusion of the cartography. In 1475 Hermann Lichtestein published at Vicenza the first copy of the Geography of Ptolemy, and two year later was published in Bologna a copy with 26 maps (Ronca and Bifolco, 2014). Since then, several copies of the Ptolemy work with the enclosed maps were published in Italy. In one of these, published at Firenze by Nicolò Todesco in 1482, there is a map of Italy with Etna volcano erupting (Figure 5).

Figure 5. Reproduction of Southern Italy in the map of Nicolò Germanicus printed in Ulm in 1482. Only Etna (Gibilmons) displays signs of activity (reproduced after Borri, 2004).

3.1 The volcanoes of the Neapolitan region

During Middle Age, Vesuvius had several eruptions. The last eruption had been that of 1139 and since then the volcano had entered a quiescent stage which lasted to 1631 (Scandone et al., 1993). Ischia island had several eruptions during Roman time and then an eruption in 1302 with a lava flow reaching the sea. Campi Flegrei had a prolonged period of activity between 5000- and 3000-years BP and a new eruption in 1538, with the formation of a scoria cone called Monte Nuovo. This eruption drew the attention of scholars who described the eruption in several letters (Giustiniani, 1817). One of these letters, that of Delli Falconi published in 1538, contains an image of the erupting volcano and its proximal environment (Figure 6). The image provides information on the uplift which preceded the eruption (*termine del mare di prima – limit of the extension of the sea before –* the eruption). Another image of the same eruption is contained in a letter by Marchesino (1538) (Figure 7). A perspective view of Vesuvius, Naples, and Campi Flegrei with the eruption of Monte Nuovo (Figure 8), is one of the first representation of the area comprised between Capri to Ischia. It was published by Antonio Salamanca in Rome in 1538-1540, and was made by an anonymous called Maestro del Trabochetto, possibly identified as Giovanni Agucchi, (Ronca and Bifolco, 2014). It shows the eruption of Monte Nuovo and, to the East, a towering Vesuvius, quiescent at that time, without any sign of activity.

Figure 6. A rough map of Pozzuoli area with the eruption of Monte Nuovo in 1538. The map outlines the limit of the sea before the eruption which had been preceded by a substantial uplift of the ground. The village of Tripergole was destroyed by the eruption (reproduced after Delli Falconi, 1538).

Figure 7. Another image of the eruption of Monte Nuovo in 1538 (reproduced after Marchesino, 1538).

The map of Ischia by Mario Cartaro and Giulio Iasolino of 1586 (Figure 9), made to illustrate the thermal baths of the Island, is enclosed in the book by Giulio Iasolino, 1588, *De Rimedi Naturali che sono nell'Isola di Pithecusa Hoggi detta Ischia.* Beside the illustration of the thermal baths, the map shows a nice view of the place of the eruption of 1302 with its lava flow reaching the sea. The place is defined *Locus terribilis incendy* (Place of the terrible fire) popularly called *Le Cremate* from which derives the Italian name Arso (Burned land).

Figure 8. A map of the bay of Naples with the eruption of Monte Nuovo in 1538. Vesuvius volcano appears without any sign of activity. The map was produced by Salamanca in Rome, by an anonymous author named *Maestro del Trabocchetto* (reproduced after Bifolco and Ronca, 2014).

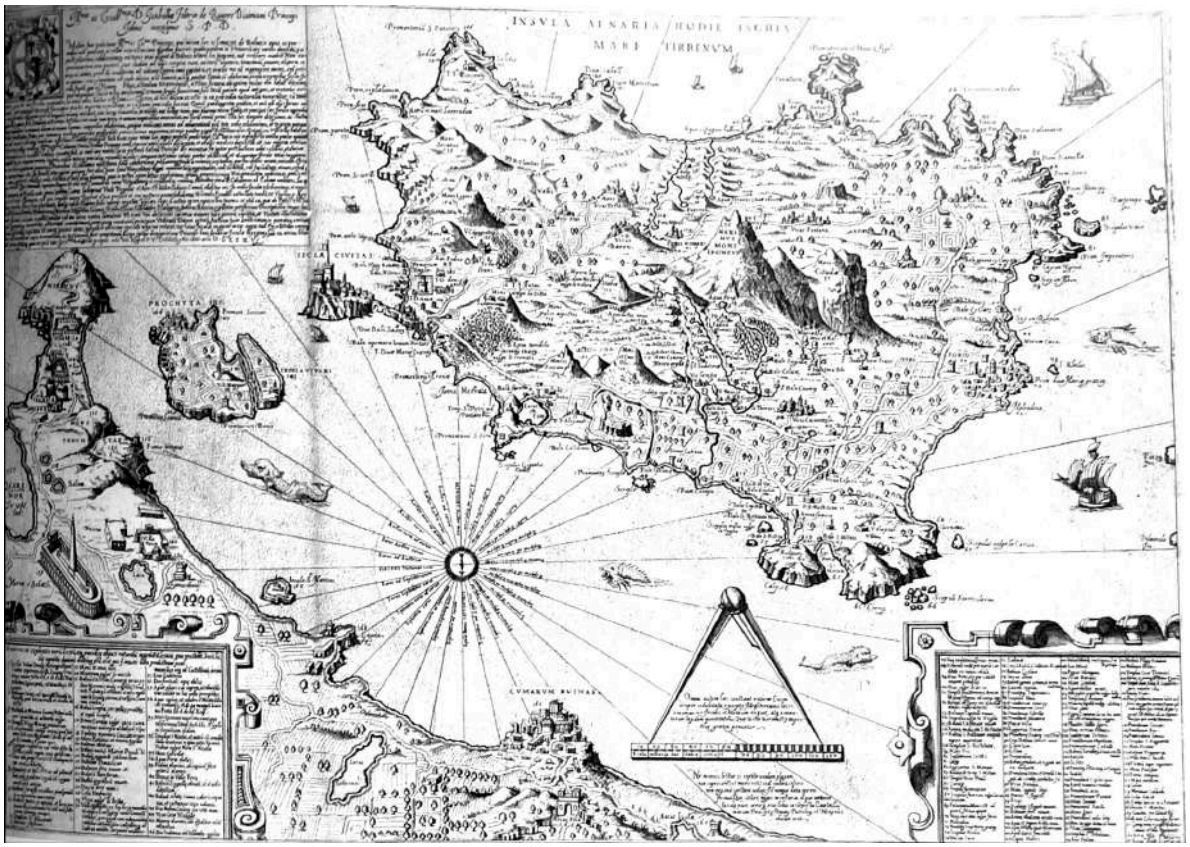

Figure 9. The map of Ischia drawn by Mario Cartaro in 1586 for the book of Giulio Iasolino, 1588, *De Remedi*. In the center of the image the cone of the Arso volcano formed in 1302. The lava flow reaches the sea and the text remember the place of the *Horrible fire* (reproduced after Bifolco and Ronca, 2014).

3.2 The Sicilian Volcanoes

The historical activity of Etna dates to the VIII century BC. However, there is a gap in the knowledge of its activity especially between 252 and 1062 CE (Branca and Abate, 2014). Better information exists after this period and numerous eruptions are recorded after 1300.

The activity of Vulcano Island is already mentioned by Strabo (I century BC-I century AC) when liquid fire was seen at its top. Scarce information is available till 1400; since this time, numerous eruptions are reported till 1888-90 after which the volcano entered a quiescent period (Barbano et al., 2017).

The activity of Stromboli volcano is reported since the IV century BC. Rosi et al. (2000) suggest that between the III and VII century CE, after a period of quiescence the volcano resumed an activity like the present one characterized by mild explosions occurring at intervals of 10-20 minutes. The normal activity is periodically interrupted by lava flow emission and/or major explosions and paroxisms.

One of the first map reporting the activity of Etna is that of Nicolò Todescho of 1482 where red flames appear on the top of the volcano.

The map of Sicily of Giacomo Gastaldi of 1545 (Figure 10) is the first regional map of Italy (Bifolco and Ronca, 2014). The data used to implement it were those by Francesco Maurolico book *Descrittione dell'isola di Sicilia* for which the map had been produced (Almagià, 1929). There are some peculiarities in the representation of the volcanoes. Etna, called M. Gibello is depicted in eruption. It may probably be a reference to the large 1536 eruption occurred after about forty years of quiescence (Maurolico in Guidoboni et al., 2014). The other volcano displaying smoke rising from the top is

Vulcano, which had the last major eruption in 1444 but was then in a mild fumarolic activity (Fazello, 1558). The island had been divided by the nearby Vulcanello until the time when Fazello lived, and then linked with Vulcano by volcanic activity which filled the shoal between the two islands. The map of Gastaldi shows two separated islands. According to Barbano et al. (2017) the two islands were already linked in 1544. Possibly the words of Fazello (at *my time*) should be interpreted as (*at an earlier time*) as he later affirms *now the channel is filled with ashes erupted by Vulcano.*

The most singular aspect of this map is the smoke rising from Filicudi (Felicur) suggesting volcanic activity like Vulcano. No recent volcanological work has ever reported any kind of activity of Filicudi in historic time neither the source of Gastaldi (Maurolico) reports such feature. We do not know the source of this representation, but it was later copied in many other maps.

A derivation of Gastaldi map is that of Hieronimus Cock of 1553 (Almagià, 1929) (Figure 11). According to Valerio (2012), Cock came to Italy between 1546 and 1548 and probably bought back a copy of the map of Sicily made by Gastaldi. The Etna is called Gibello and is in eruption, Vulcano and Filicudi show signs of activity and Vulcanello is separated by Vulcano by a stretch of sea.

The map of Italy by Gastaldi-in the Atlas of Lafrery, of 1561 (Figure 12) shows the same peculiarities of the earlier two for Sicily and Eolian islands with also Stromboli depicted in activity. The peculiar aspect of the map is the island near Vulcano, presumably Vulcanello, which is still separated by the sea, but another island in eruption near Stromboli is called Vulcanello. We infer that it may be the small island of Strombolicchio which however had no eruption in historical time.

Several later maps derived by the one of Gastaldi, 1561, contain these same peculiarities in the distribution of Eolian Islands and their status of activity.

The map of the Reign of Naples by Paolo Cagno, firstly published in 1582, has Filicudi without any sign of activity (Figure 13).

A similar map was that of Cartaro and Stigliola published in 1613 which display only the activity of Stromboli and a perfectly quiescent Vesuvius (Figure 14).

The map of Magini, published in Amsterdam in 1616 by Willelm Janson Blaew (Borri, 1999) represent a great improvement in the geographic representation (Almagià, 1922) and shows the activity of Etna and Stromboli whereas the one of Vulcano is not clear because on the border of the sheet, there is no sign of activity at Filicudi

In all these maps there has never been any reference to Vesuvius which returned into activity in 1631.

Figure 10. The map of Sicily of Giacomo Gastaldi drawn in 1545 to illustrate the book of Maurolico (1545). The map shows the activity of Etna (M. Gibello), Vulcano, and, for the first time Filicudi (Felicur).

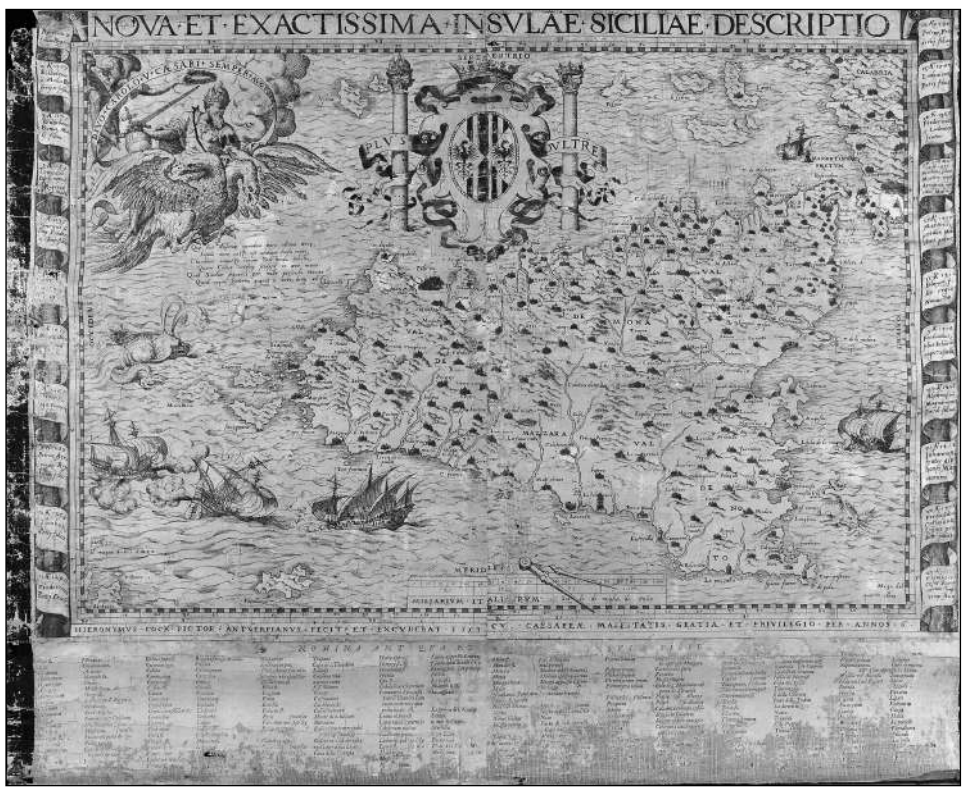

Figure 11. The map of Sicily of Hieronimus Cock of 1553. It is probably a derivation of the map of Gastaldi of 1545 and reports the same peculiarity of the activity of Filicudi, also like Gastaldi, reports a wrong location, with respect to Etna, of Randazzo and Linguaglossa (reprinted after Valerio, 2012).

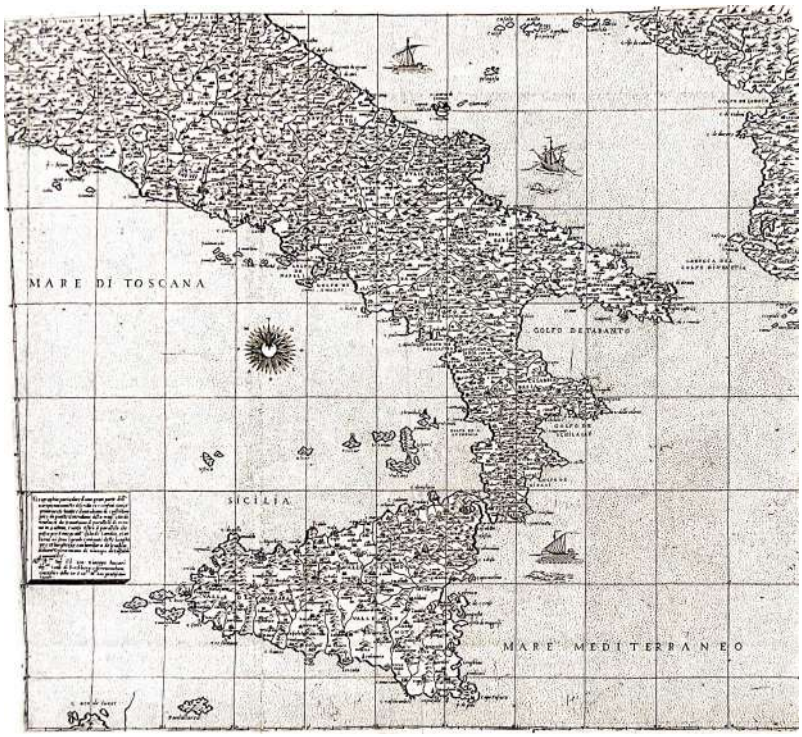

Figure 12. The map of Italy of Giacomo Gastaldi published in 1561. The active volcanoes are Etna, Vulcano, Stromboli and Filicudi and an island near Stromboli called Vulcanello. However, Vulcanello is drawn near Vulcano but still separated by it (reprinted from Bifolco and Ronca, 2014).

Figure 13. The map of Italy of Paolo Cagno of 1582 (reprinted after Oliva, 2020).

Figure 14. A particular of the map of Cartaro-Stigliola published in 1613. It delineates a quiescent Vesuvius, a few years before its return into activity in 1631 (reprinted from Biblioteca Nazionale di Napoli).

4. Frescoes and Painted Maps

The printing and the discovery of new lands made Geography popular among scholars and learned people. Having rooms adorned with maps became a sign of richness especially if they showed the extension of owned estates and fiefdoms (Scultz, 2006).

In Italy there are several examples of this new custom namely: Palazzo Vecchio in Florence, Farnese Villa in Caprarola, the Benedettini Convent in Parma, the Vatican Museums in Rome and Sacchetti-Chigi Villa at Castelfusano in Rome.

The cycle of Palazzo Vecchio was initiated in 1563 by the cosmographer and mathematician Egnatio Danti and completed in 1588 by Stefano Bonsignori on request of the Grand Duke Cosimo I de Medici and later by his son. The maps were painted on the cabinet doors of the Wardrobe. There were 53 maps representing the Geography of Ptolemy and the new world. The map of Italy (Figure 15) completed by Stefano Bonsignori in 1578, probably derives by the map of Gastaldi. The only volcano represented in eruption is Etna. The volcanoes of Eolian Islands have less details. No signs of activity are evident for Vesuvius or Campi Flegrei.

The Villa at Caprarola was adapted into a country villa by Cardinal Alessandro Farnese in 1559. Among the decorations subjects is the "Room of the World Map" or *Sala del Mappamondo*, displaying the whole known world as it was in 1574 when the frescoes were completed. There are seven large geographic maps representing the world as a whole and Italy and Palestine. Giovanni Antonio Vanosino da Varese draw the frescoes. Most aspects of the map of Italy derive from Gastaldi map of 1561 (Partridge, 1995) and the only volcano showing signs of activity is Etna (Figure 16).

The geographic cycle in the Abbey of San Giovanni Evangelista in Parma was commissioned by the Abbot Stefano Cattaneo da Novara to the painters Giovanni Antonio Paganino and Ercole Pio in 1574. They decorated the library with frescoes depicting, among the others, Italy, and the Holy Land. The map of Italy is derived by that of Gastaldi and has a size seven times the original. Because of the size, the Sicily was not represented (Monastery of San Giovanni Evangelista, 2019). There is no evidence of activity of the volcanoes of Eolian Islands.

Figure 15. The map of Italy painted in the cabinet doors of the Wardrobe of Palazzo Vecchio in Florence. The only volcano showing signs of activity is Etna (reproduced after Cecchi and Pacetti, 2008).

In the Vatican there are two cycles of geographic maps. The older in the third Loggia was initiated under Pope Pius IV (1559-1565) and completed under Gregory XIII (1572-1585). Among the authors is Giovanni Antonio Vanosino da Varese. The frescoes, in an open corridor, were soon damaged because of the bad weather and were later restored at different times. The map of Italy derives by the map of Gastaldi of 1561 and the Sicily from the one of 1545 (Almagià, 1955). The map is too much deteriorated to offer any clues on the state of the volcanoes.

The second geographic cycle of the Vatican is that in the Great Gallery of Geographic Maps. It was commissioned by Pope Gregory XIII to Egnatio Danti.

Figure 16. A particular of Sicily in the map of Italy of Farnese Villa in Caprarola with Etna in eruption (photo of the authors).

Danti was a mathematician and geographer who had overseen the compilation of the geographic maps of Palazzo Vecchio in Florence where he had completed 30 of the 57 maps. In 1575 he was removed from his office and his role was taken over by Bonsignori. Danti had been inquired by the Inquisition probably because his public demonstration on the delay of the Julian calendar which prevented the correct celebration of the Easter (Marcolin, 2008). He was released by these charges and went to Bologna to teach mathematics. He gained the confidence of Greogory XIII by drawing the maps of the borders of the Papal State who later commissioned to him the drawing of the maps of the Gallery of Geographical Maps. He also joined the commission charged with revising the Julian calendar. The maps were made in 1580-1581. 32 large maps cover the wall of the gallery with eight smaller ones. The Italian territories ore ordered from North to South with on the right the lands on the Ligurian and Tyrrhenian Sea and to the left those on the Adriatic Sea. (Caffo, 2021).

The maps were restored several times: The earlier important ones were made in 1626-28 and then a substantial redrawing of several maps in 1632 under the direction of Luke Holsten (Luca Olstenio) (Almagià, 1942, 1955; Caffo 2021).

The map of relevance for the volcanoes are those relative to Sicily and Campania, Italia Nova and Italia Antiqua.

Sicily was the map with minor restorations (Caffo, 2021) and we may be confident that it was the one painted by Danti. It has the south toward the upper part and resembles the map of Sicily of Gastaldi of 1545. It shows the eruption of Etna, Vulcano and Filicudi like the earlier model. Stromboli is not represented in the map (Figure 17).

Campania had several restorations in 1626-28 and again in 1635 (Caffo, 2021). Vesuvius is correctly drawn along with Monte Somma, but there is no sign of activity (Figure 18) so we presume that the restoration may have been before the great eruption of 1631.

Figure 17. Map of Sicily in the Gallery of Geographic Maps in the Vatican Museums. The map is derived by Gastaldi map of 1545 with the South in the upper part. Etna, Vulcano and Filicudi in activity are shown in the insets in the upper and lower parts (photo of the authors).

Figure 18. Map of Campania in the Gallery of Geographical Map of Vatican Museums. In the inset, an enlargement of Vesuvius without any sign of activity (photo of the authors).

Of more interest are the two maps of Italy which were completely redrawn under the direction of the cartographer Luke Holsten (Luca Holstenio) in 1632 (Almagià, 1942, 1955; Caffo, 2021). According to Almagià (1942) one of the sources used for drawing the topography of Southern Italy was the map of Cartaro of 1613. The map of Italia Nova (Figure 19) show activity at Stromboli and Vulcano but no activity on Filicudi at difference with the map of Sicily. A major substantial difference with all previous maps is the representation Vesuvius in eruption. The volcano had returned into activity on 16 December 1631, after a prolonged quiescence period. The violent explosive eruption caused extensive damage and raised concern all over Europe. We suggest that the restoration made by Holsten in 1632 took notice of this important event occurred only a few months before and represented the activity of the volcano for the first time on a map of Italy.

The map of Italia Antiqua has peculiarities like that of Italia Nova, shows activity at Stromboli and Vulcano. Vesuvius also is in eruption. We believe that the drawing also of Pompeii (Figure 20) near Vesuvius is a reference to the eruption of 79 AD which destroyed Pompeii. At the time of the restoration, the location of Pompeii was still unknown.

The last geographic cycle is that of Villa Sacchetti-Chigi in Castelfusano, Rome. The villa was purchased in 1620, together with the annexed castle, by a family of Tuscan bankers, the Sacchetti, in business relations with the Barberini family. After the election of Urban VIII, born Maffeo Vincenzo Barberini, (pope from 1623 to 1644), the Sacchetti moved to Rome and became the pope's bankers.

Between 1626 and 1631, the villa was embellished with a series of frescoes made by various artists under the direction of Pietro da Cortona. Among the many decorative improvements, various geographical maps stand out on the walls of the Gallery on the second floor.

The map of Sicily (Figure 21) recalls the one by Gastaldi of 1545 and displays clear signs of activity at Etna, Vulcano and Filicudi. The map of Italy does not show any such peculiarity for Vesuvius, thus confirming that the frescoes were completed before the eruption of 1631 and one year before the redrawing of the maps of the Vatican, but Vulcano is depicted with a violent eruption (Figure 22), possibly suggestive of the eruption of 1626.

Figure 19. Map of Italia Nova in the Gallery of Geographical Map of Vatican Museums. In the insets, an enlargement of Vesuvius in eruption, and the Eolian Islands with the activity of Vulcano and Stromboli and no activity in Filicudi (photo of the authors).

Figure 20. Map of Italia Antiqua in the Gallery of Geographical Map of Vatican Museums. In the insets, an enlargement of Vesuvius in eruption and the location of Pompeii, and the Eolian Islands with the activity of Vulcano and Stromboli and no activity in Filicudi (photo of the authors).

5. Discussion and Conclusions

The analysis of manuscripts and printed maps reporting the activity of Italian volcanoes suggests that between Middle Age and the Renaissance Etna, Vulcano and Stromboli were continuously active. The last news of an activity at Vesuvius are found in the Arab manuscript by El Idrisi of 1154. Its return into activity in 1631 is firstly reported in the map of Italy of the Vatican Museums redrawn by Luke Holsten in 1632.

A long period of quiescence affected Vesuvius between 1139 and 1631, and any sign of its activity disappeared on the maps of Reinassance age.

The correct information (no activity at Filicudi) was reported when the more detailed maps of the Reign of Naples were made available. This feature is well shown in the maps of the Gallery of Geographical maps of Vatican, where the earlier frescoes made in 1580 are based on Gastaldi Maps. The restoration of some frescoes made by Luke Holstern corrects the error and further show the new activity of Vesuvius which started only one year before the restoration.

The eruption of Filicudi reported by Gastaldi in 1545 must be considered untruthful as no evidence of an activity of the Island is reported in any historical or recent volcanological work. This error was reported by later authors and can be used to attribute the source of information used by them. It is however impressive to observe how an error transcribed on printed paper can become an axiom for later authors and how difficult it is to get rid of it. This should be a warning to check the accuracy of the sources as unfounded news published without verification can be perpetuated for a long time and cause considerable damage

We believe that an interdisciplinary approach to Geography may help to gain a better understanding of how ancient maps were built and offer peculiar information of the period in which they were made. At the same time the information contained in geographic maps may help to fill gaps in the knowledge of the historical record of eruptions.

Figure 21. The map of Sicily in the Sacchetti-Chigi Villa in Rome Castel Fusano shows the activity of Etna, Vulcano and Filicudi (photo of the authors).

Figure 22. The map of Italy in the Sacchetti-Chigi Villa in Rome Castel Fusano shows only the activity of Vulcano (photo of the authors).

Acknowledgements

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