

L. LANCINI

ECHOES OF ANCIENT VOLCANIC
REPRESENTATIONS: A GEO-MYTHOLOGICAL
APPROACH

ESTRATTO

da

PHYSIS

Rivista Internazionale di Storia della Scienza

2020/1-2 (LV)



Leo S. Olschki Editore
Firenze

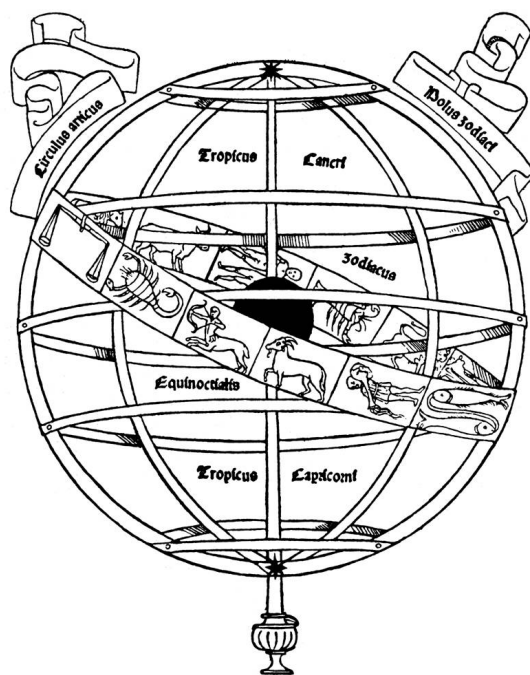
VOL. LV (2020)

NUOVA SERIE

FASC. 1-2

PHYSIS

RIVISTA INTERNAZIONALE DI STORIA DELLA SCIENZA



LEO S. OLSCHKI EDITORE
FIRENZE

PHYSIS

RIVISTA INTERNAZIONALE DI STORIA DELLA SCIENZA

pubblicata dalla
DOMUS GALILÆANA DI PISA

in collaborazione con
SOCIETÀ ITALIANA DI STORIA DELLA SCIENZA
SEMINARIO DI STORIA DELLA SCIENZA DELL'UNIVERSITÀ DI BARI

DIREZIONE E REDAZIONE
(EDITORS)

Direttore responsabile (Senior Editor): STEFANO CARRAI.

Direttori (Editors): FRANCESCO PAOLO DE CEGLIA, CARLA RITA PALMERINO, CLAUDIO POGLIANO.

Comitato direttivo (Editorial Board): MONICA AZZOLINI, MARCO BRESADOLA, MAURO CAPOCCI, GIOVANNI DI PASQUALE, RENATO FOSCHI, SERGIO GIUDICI, LUIGI INGALISO, SANDRA LINGUERRI, ERIKA LUCIANO, ELIO NENCI.

Responsabili delle recensioni (Book Reviews Editors): ANDREA CANDELA, GIULIA GIANNINI, MATTIA MANTOVANI.

Redazione (Editorial Office): DAVID CECCARELLI, LUCIA DE FRENZA.

CONSIGLIO SCIENTIFICO
(ADVISORY BOARD)

MAURO ANTONELLI, GIULIO BARSANTI, MARCO BERETTA, DOMENICO BERTOLONI MELI, PAOLA BERTUCCI, JANET BROWNE, ELENA CANADELLI, LUCA CIANCIO, MARCO CIARDI, GUIDO CIMINO, ANTONIO CLERICUZIO, MARIA CONFORTI, BARBARA CONTINENZA, VINCENZO DE RISI, FEDERICA FAVINO, PAULA FINDLEN, PAOLO GALLUZZI, PAOLA GOVONI, NICCOLÒ GUICCIARDINI, MICHAEL HAGNER, NICK HOPWOOD, MARIANNE KLEMUN, MATTEO MARTELLI, RENATO G. MAZZOLINI, MASSIMO MAZZOTTI, MARIA MONTSERRAT CABRÉ PAIRET, CARMELA MORABITO, STAFFAN MÜLLER-WILLE, GIULIANO PANCALDI, IRINA PODGORNÝ, GIANNA POMATA, TELMO PIEVANI, CLAUDIA PRINCIPE, PIETRO REDONDI, HANS-JÖRG RHEINBERGER, ANTONELLA ROMANO, PAOLO ROSSI, SOPHIE ROUX, DAGMAR SCHÄFER, EZIO VACCARI, STÉPHANE VAN DAMME.

E-MAIL: francescopaolo.deceglia@uniba.it

2020: ABBONAMENTO ANNUALE (2 fascicoli) – ANNUAL SUBSCRIPTION (2 issues)

Il listino prezzi e i servizi per le **Istituzioni** sono disponibili sul sito
www.olschki.it alla pagina <https://www.olschki.it/acquisti/abbonamenti>

Subscription rates and services for Institutions are available on
<https://en.olschki.it/> at following page:
<https://en.olschki.it/acquisti/abbonamenti>

PRIVATI

Italia € 106,00 (carta e on-line only)

INDIVIDUALS

Foreign € 140,00 (print) • € 106,00 (on-line only)

SOMMARIO

E. VACCARI, Saluti	pag.	1
M. CONFORTI, M. BRESADOLA, L. INGALISO, Introduzione	»	3
S. FURLANI, D. MUSUMECI, Were the Continents Drifting before Continental Drift? Domenico Lovisato and the Role of Wegener's Precursors in the Theory of Continental Drift . . .	»	11
P. MACINI, F. CONSOLE, M. PANTALONI, Mapping Petroleum Resources in Italy: From Antonio Stoppani to the Foundation of Agip (1926)	»	33
L. LANCINI, Echoes of Ancient Volcanic Representations: A Geo-Mythological Approach.	»	49
E. CANADELLI, Documentare e celebrare: Pier Andrea Saccardo e l'iconoteca dei botanici di Padova tra Otto e Novecento . . .	»	71
G. PARETI, Landscape and Biophilia	»	87
A. VISCONTI, Leafing through Nature. The <i>Herbarium Centrale Italicum (HCI)</i> Established in 1842 by the Botanist Filippo Parlatore	»	105
B. CAMPANILE, The Deceit of the Cold: Trench Foot between Neurology and Dermatology	»	125
L. DE FRENZA, Suspended between Life and Death. Drowning in Tuscan Medical and Legal Literature of the 18th Century. . .	»	147
C. PEPE, La natura del colera: contagiosa o epidemica? Visioni e teorie a Napoli durante l'epidemia del 1836 e la riflessione di Vincenzo Lanza	»	165
L. TONETTI, La medicina nei <i>Mémoires de Trévoux</i>	»	179
S. CAIANIELLO, From Organ Culture to the New 3D Organotypic Culture Systems: Conceptual Pathways.	»	203

M. BELLINI, Psellos' Petrified Root: Transmutations and Natural Wonders from Classical Antiquity to Byzantine Times	pag. 223
D. MORRONE, La mirabile fusione fredda del piombo da Teofrasto a Plutarco. Un riesame critico della questione.	» 243
C. CARELLA, Giordano Bruno 'delineatore del campo della natura'	» 261
N. DI TOMMASO, Ulisse Aldrovandi lettore di Lucrezio	» 277
G. POLIZZI, "La vista della bella natura desta entusiasmo." Lo spettacolo della natura in Giacomo Leopardi, tra 'filosofia naturale' e immaginazione poetica	» 295
L. TRAETTA, The Universality of Natural Energy. Bernard Forest De Bélidor and Hydraulic Machines.	» 309
F. LUSITO, Divulgare la scienza, rivoluzionare la società: gli interventi giornalistici di Lucio Lombardo Radice	» 325
G. CAPOBIANCO, G. FERRARO, Gino Loria ed Ernesto Pascal: memoria e oblio in una polemica di fine Ottocento.	» 349
G. FERRIELLO, Istanza formativa e istanza estetica di un manoscritto persiano della meccanica di Erone	» 365
E. LOIODICE, Storia, mito e realtà: l'origine del pensiero scientifico per Giorgio Diaz de Santillana.	» 383
M. FOCACCIA, The 'Practical School' of Physics at Via Panisperna: From the Lecture Theatre to the Laboratory	» 399
G. IENNA, Fisici italiani negli anni '70 fra scienza e ideologia	» 415
A. CEREÀ, Rendere visibile la psiche. Bohr, Freud e Devereux: lo scienziato da spettatore ad attore	» 443
F. FRISINO, Le declinazioni scientifiche del tarantismo in Ignazio Carrieri e Francesco De Raho.	» 459
A. MOLARO, La 'logica immanente' della follia: biochimica e fenomenologia in Roland Kuhn (1912-2005).	» 477
L. LEPORIERE, La contesa dell'ipnotismo. La classe medica contro gli spettacoli di Donato in Italia	» 499

Recensioni

- L. MONTEMAGNO CISERI, *Mostri. La storia e le storie* (I. Ampollini) – C. SANDER, *Magnes. Der Magnetstein und der Magnetismus in den Wissenschaften der Frühen Neuzeit* (A. Strazzoni) – P.D. OMO-DEO, J. RENN, *Science in Court Society. Giovan Battista Benedetti's Diversarum speculationum mathematicarum et physicarum liber (Turin, 1585)* (F. Favino) – A. DE PACE, *Galileo lettore di Copernico* (P.D. Accendere) – B. BELHOSTE, *Paris Savant. Capital of Science in the Age of Enlightenment* (M. Storni) – R. PASSIONE, *La forza delle idee. Silvano Arieti: Una biografia, 1914-1981* (R. Foschi). pag. 517

ECHOES OF ANCIENT VOLCANIC REPRESENTATIONS: A GEO-MYTHOLOGICAL APPROACH

LOREDANA LANCINI
CreAAH (CNRS - UMR 6566) Le Mans Université *

ABSTRACT – Reflections, studies, and observations on volcanic phenomena, especially about Etna, and their consequences on natural and human landscapes can be traced back to early moments of Greek colonization on Sicily. Hesiod (8th-7th c. BC) was the first to mention the myth of the battle between Zeus and Typhon, which conceals the memory of an ancient volcanic eruption. This very same narrative motif is echoed in the production of later authors wherein a description of Etna's volcanic eruptions is recognizable. The character of Typhon can be found in other volcanic contexts as well, thus becoming a *topos* alluding to volcanic activity. These considerations demonstrate an archaic aptitude in representing and explaining nature through myth, whose suggestive language permits to encode memories of real events. Defined as 'geomythology,' this methodological approach will be employed to analyse the figure of Typhon and its connection with Mount Etna, which will allow new insights into the analysis of ancient volcanic representations.

SOMMARIO – Fin dagli inizi della colonizzazione greca in Sicilia i Greci svilupparono riflessioni, studi e osservazioni sui fenomeni vulcanici, a causa anche dell'intensa attività dell'Etna. Esiodo (VII-VIII s. a.C.) fu il primo autore greco a menzionare il mito della battaglia tra Zeus e Tifone, un mito che reca la memoria di un'antica eruzione vulcanica. Questo stesso motivo narrativo è presente in molti altri autori greci e latini per indicare l'immagine dell'Etna in eruzione o in relazione ad altri contesti vulcanici. Il mito di Tifone si caratterizza quindi come un *topos* per alludere all'attività vulcanica. Possiamo sostenere dunque che il mito, grazie al suo linguaggio evocativo e suggestivo, era uno strumento per rappresentare e spiegare la natura e per preservare la memoria di eventi reali. Ciò rappresenta il principio base della 'Geomitologia,' il cui approccio viene usato in questo lavoro per analizzare la relazione tra Tifone e l'Etna e per comprendere come venivano rappresentate le eruzioni vulcaniche nell'Antichità.

* UFR Lettres, Langues et Sciences Humaines, Maison des Sciences Humaines Avenue Olivier Messiaen, 72085 - LE MANS Cedex 09, e-mail: loredana.lancini@univ-lemans.fr.

THEORISING VOLCANO PHENOMENA IN ANTIQUITY

1. *Naming the volcano*

Greek colonies in Southern Italy, called Magna Graecia, and Sicily¹ had settled in an area subjected to the volcanic phenomena of Etna and Vesuvius.

Because the area had been continuously occupied in ancient times, it is arguable that local and Greek communities of the region were not particularly aware of the volcanic hazard, or that they did not fully conceptualize it. Arguably, ancient populations that settled in the shadows of Italian volcanoes did not recognize their dangers and could not clearly distinguish between mountains and volcanoes.

Apparently, volcanoes were not a well-defined geological landmark: there are no specific words for 'volcano' in Greek nor in Latin. Greeks simply used ὄρος διάπυρον, whereas in Latin, it was referred to as *mons igneus*, no more than a 'spitting-fire mountain.'² Moreover, volcanoes are generally absent in Ancient Art: the only known figurative representation of a *mons igneus* is the well-known fresco in the atrium of the House of the Centenary from Pompei.³ A giant snake dominates the scene next to an altar in the foreground, while Bacchus stands out in the background with an odd configuration of a bunch of grapes. The Vesuvius is set next to the god as a landscape element, and its slopes are covered by vines, underlining the bucolic aspect of the scene. Nothing reveals its dangerous charge as it waits to explode. It is noteworthy to highlight that the fresco, which clearly precedes the eruption of AD 79, depicts a Vesuvius that differs from its appearance today because its large and deep internal crater was created during the explosion of the 1st century AD.⁴ Even in the Tabula Peutingeriana, the early-medieval copy of an ancient Roman map showing road routes and post stations as well as the main geographical indications in a highly conventional manner, Etna and Vesuvius are represented with the same symbology of other harmless mountains (segment VI.2 and segment V.5). However, the lack of systematicity that could have been attributed

¹ The process of colonization started in the 8th century BC. See BÉRARD, 1957 on Greek Colonization in Sicily and Southern Italy. For an overview of the process of Greek colonization, see TSETSKHLADZE, 2006.

² ALCOLAT, 2017 proposes a discussion about Greek and Latin terminology on volcanoes.

³ PUGLIESE CARRATELLI, 1999, p. 903.

⁴ LUISI, 1989. A simple handbook on the volcano is NAZZARO, 2009.

to the ancients is contradicted by a series of very accurate descriptions of the physical phenomena connected to the eruptions, where every detail, described using mimetic and metaphorical terminology, contributes to an almost photographic representation of Etna.

2. Imagining the Volcano: volcanic activity in ancient literature

Strabo, a Greek geographer from Amasia, who lived between the 1st century BC and the 1st century AD, introduces the description of Etna as follows:

Now the city of Etna is situated in the interior about over Catana, and shares most in the devastation caused by the action of the craters; in fact the streams of lava rush down very nearly as far as the territory of Catana; [...] According to Poseidonius, when the mountain is in action, the fields of the Catanaeans are covered with ash-dust to a great depth. Now although the ash is an affliction at the time, it benefits the country in later times, for it renders it fertile and suited to the vine, the rest of the country not being equally productive of good wine; [...]. But when the lava changes to a solid, it turns the surface of the earth into stone to a considerable depth, so that quarrying is necessary on the part of any who wish to uncover the original surface; for when the mass of rock in the craters melts and then is thrown up, the liquid that is poured out over the top is black mud and flows down the mountain, and then, solidifying, becomes millstone, keeping the same colour it had when in a liquid state. [...] so the ashes of Etna, it is reasonable to suppose, have some quality that is peculiarly suited to the vine.⁵

The topmost parts of the mountain appear to undergo many changes because of the way the fire distributes itself, for at one time the fire concentrates in one crater, but at another time divides, while at one time the mountain sends forth lava, at another, flames and fiery smoke, and at still other times it also emits red-hot masses; and the inevitable result of these disturbances is that not only the underground passages, but also the orifices, sometimes rather numerous, which appear on the surface of the mountain all round, undergo changes at the same time.⁶

These lengthy quotations suggest that Greeks were indeed interested in the whole spectrum of volcanic phenomena. Strabo offers a detailed description of eruptions and how those catastrophic events shaped the sur-

⁵ Strabo VI.2.3. According to the specific field standards, ancient authors follow the Oxford Classic Dictionary, 4th edition. Open access translation of ancient authors can be found online in the Perseus Digital Library: <http://www.perseus.tufts.edu/hopper/collection?collection=Perseus:collection:Greco-Roman>.

⁶ Strabo VI.2.8.

rounding landscape. It is also noteworthy to underscore the attention given to the whole area's geographical description.

Not only were geographers and philosophers fascinated by Etna, but common men and local elites apparently took interest as well, and the area experienced a sort of proto-tourism in the form of hikers, who explored the volcano's mountainous slopes. Strabo evidently knew this social phenomenon and, in at least one occasion, interviewed local excursionists to receive first-hand information of the area. An in-depth reading of ancient sources immediately reveals that the volcanic phenomena captured the interest and attention of various authors: historians, philosophers, and geographers alike. A passage from Lucretius' *De Rerum Natura* also provides an attempt to find a precise terminology to illustrate the eruptive phenomenon:

When this wind gets hot and [...] draws out from them a searing fire with swift flames, it rises, hurling itself high up and thus straight through the mountain's jaws. And thus it carries heat long distances, scatters its glowing ash over a huge area, and rolls out thick, dark, murky smoke, while at the same time tossing up boulders of amazing weight. [...] It then blows out, thus pushing up the flames hurling out rocks, and raising clouds of sand. For at the summit there are what those men name craters – features we call jaws and mouths.⁷

In this passage, Lucretius insists on describing the various manifestations of volcanic activity in the most verisimilar way possible: there are fire and flames (*ignem, flammis*), the fiery mountain produces and emits from its mouth (*faucibus, craters*) clouds of ash, smoke (*arenae nimbus, caligine*), rocks and glowing boulders (*saxa*).

Despite the accuracy of these descriptions, it has also been said that the Greeks lacked any real experience with such phenomena.⁸ Active volcanoes in Greece were indeed in dormancy during the prime of the Hellenic civilization and only in more recent times did their destructive power manifest. The Methana volcano erupted once again only in 258 BC,⁹ whereas Santorini similarly resumed in activity only in 197 BC.¹⁰

However, the Greeks should have come into contact with volcanic phenomena at a very early stage of their history. Relations between Greeks and Levantine cultures can be traced back to the 10th century BC: Anatolic

⁷ Lucr. VI. 686-702. For a discussion on volcanoes in Lucretius' literary production, see GUITTARD, 2004.

⁸ HARRY, 2002.

⁹ Strabo 1. 3. 18; Ov. Met. 15. 296-306; Paus. 2. 34. 1.

¹⁰ Plin., HN 2. 202 and Sen. QNat. 2. 26. 4-6.

regions are marked by very active volcanoes¹¹ and local legends flourished around these volcanoes.¹²

Moreover, from the 8th century BC, the Greeks colonized southern Italy and Sicily and certainly came into contact with its volcanic phenomena. Although it is not always easy to reconstruct the history of eruptions of the earliest period, there are a number of known eruptions of Etna for the period corresponding to the Greco-Roman occupation.

2.1. Etna's volcanic activity in Greco-Roman historiography

Before the arrival of the Greeks, Sicily was devastated by a phreatomagmatic eruption that dated between 1520 and 1270 BC,¹³ which, according to Diodorus (V.6.2-3), caused the Sicans to abandon the eastern part of Sicily. Geological data attest to two more eruptions before the period of Greek colonization, from 1250 to 900 BC and from 1010 to 830 BC.¹⁴

Thucydides (III.116.1-3) knew at least three eruptions that interested Sicily and that were observed by the Greeks. While the second and the third one of the sequence can be dated back to 475¹⁵ and 425 BC respectively with a certain degree of certainty, dating the oldest of these three eruptions has proved to be more difficult. The first arrival of Greek colonists should be considered a *terminus post quem* in this respect if we assume that Thucydides had received information from a Greek written source or oral tradition: it could therefore be argued that the first eruption known to Thucydides occurred between the 8th and 7th¹⁶ century BC, when the first Greek colonists arrived in Sicily.

The 6th and 5th centuries BC are also marked by numerous eruptions. In fact, around 500 BC,¹⁷ Sicily witnessed an eruption, and another one took place around 420 (+370-320) BC.¹⁸ In the 4th century, the two eruptions of 396 BC (Diod. XV.59.3) and 387 BC (Plat. Phaed. 111c-e;

¹¹ See for example STOTHERS, RAMPINO, 1983 and the catalogue of the Smithsonian Institute: <https://volcano.si.edu/volcano.cfm?vn=213004>.

¹² As exemplified by the myth of Ullikummi and the one of Illuyanka. The presence of active volcanoes is also present in a Neolithic wall-painting in Çatal Höyük (SCHMITT, DANIŠÍK, AYDAR et al., 2014).

¹³ BRANCA, DEL CARLO, 2004, COLTELLI, DEL CARLO, VEZZOLI, 2000.

¹⁴ BRANCA, DEL CARLO, 2004.

¹⁵ GUIDOBONI, CIUCCARELLI, MARIOTTI et al., 2014.

¹⁶ Ibid.

¹⁷ TANGUY, CONDOMINES, BRANCA et al., 2012.

¹⁸ BRANCA, CONDOMINES, TANGUY, 2015.

112e-113c)¹⁹ are recorded with certainty. Geological data have attested to a series of eruptions between the 3rd and 2nd centuries BC, although no precise dates can be attached to them.²⁰ During the Roman occupation, it was Julius Ossequente who provided dates of the three eruptions, in 140 BC (Prodig. Liber. 23), 135 BC (Prodig. Liber. 26) and 126 BC (Prodig. Liber. 29).²¹ One of the most violent eruptions of Etna occurred in 122 BC²² according to the many sources²³ that highlight its destructive impact on the entire Catania plain. This was followed by the famous eruption of 44 BC,²⁴ whose atmospheric and climatic effects are recorded in the sources.²⁵ Between the first century BC and the first century AD many eruptions were reported punctually: in 36 BC,²⁶ 32 BC,²⁷ 24 BC,²⁸ 38.²⁹ During Late Antiquity, eruptions were recorded again in 252 AD³⁰ and 417-425 AD.³¹

It is therefore necessary to point out that the Greeks, from at least the 4th century BC, have developed an interest in fire phenomena in the form of philosophical-empirical speculations, even if, discounting case of the lost work of Theophrastus³² and the anonymous didactic poem of Etna,³³ the naturalist philosophers treated volcanoes only as a secondary aspect within an overall natural theory. This is the case of Aristotle, who described volcanic eruptions in the second book of his *Meteorology* (an essay dedicated to

¹⁹ GUIDOBONI, CIUCCARELLI, MARIOTTI et al., 2014.

²⁰ 240 (+350 –310) av. J.-C. (BRANCA, CONDOMINES and TANGUY, 2015); 200 ± 200 av. J.-C. (TANGUY, CONDOMINES, BRANCA et al., 2012); 160 (+190 –170) av. J.-C. (BRANCA, CONDOMINES, TANGUY, 2015); 150 ± 200 av. J.-C. (TANGUY, CONDOMINES, BRANCA et al., 2012).

²¹ GUIDOBONI, CIUCCARELLI, MARIOTTI et al., 2014.

²² Ibid.; COLTELLI, DEL CARLO, VEZZOLI, 1998.

²³ Lucr. VI.639-646; Cic. Nat. D. II.96; Sen. QNat II.30.1; Ps.-Ermog. De invent. II.2.1, II.2.8-9; Jul. Obs. 32; Oros. Hist. Adv. Pag. V.13.3; Agost. De civ. Dei III.31; Apsine de Gadara. Ars rhet. III.15. For an overview of the Etna volcanic eruption in 2nd century BC, see BERTI, 1989.

²⁴ GUIDOBONI, CIUCCARELLI, MARIOTTI et al., 2014.

²⁵ Verg. G. I.463-473; Aen. III.554-582; Luc. Bel. Civ. I.540-549; Petron. Sat. 122.135-136; Ov. Met. XV.785-790; Manilio, Astr. II.595; Gius. Flav. Antiq. Iud. XIV.309; Ps. Aur. Vit. De Vir Ill. 78.10; Servius in Verg. G. I.466.

²⁶ GUIDOBONI, CIUCCARELLI, MARIOTTI et al., 2014; Appien, Bell. Civ. V.117.486.

²⁷ Ibid.; Cass. Dio. 50.8.3.

²⁸ Ibid.; Ep. Ex Ponto II.10.21-28.

²⁹ Ibid.; TANGUY, CONDOMINES, BRANCA et al., 2012; Svet. Cal. 51.1.

³⁰ GUIDOBONI, CIUCCARELLI, MARIOTTI et al., 2014; BRANCA, DEL CARLO, 2004.

³¹ GUIDOBONI, CIUCCARELLI, MARIOTTI et al., 2014; Olimpiodoro di Tebe in Fozio. Bibl. 58a.

³² According Diogenes Laërtius (Vitae phil. VII.42, V.II.49).

³³ Considered a veritable volcanology treaty according to LE BLAY, 2006. For an in-depth focus on the issue, see WOLFF, 2004.

the analysis of the phenomena which can be observed in the sublunar part of the world) as a particular manifestation of the category of earthquakes, explained by the well-known pneumatic theory.

According to the pneumatic model, earthquakes and eruptions are the consequence of underground movements of air that, trapped underground, seek to emerge. Earthquakes and volcanic explosions are therefore interrelated: fire would generate from the underground winds heated up by the friction, agitation or shaking of the air trapped in narrow vents, producing a shock that may lead to explosions.³⁴ Other philosophers tried to explain eruptions by resorting to the concept of the earth's central fire at the origin of hot springs and volcanic phenomena.³⁵

In regard to the representation of Etna specifically, a thorough reading of ancient sources depicts a more precise picture. The volcano is indeed present in the varied writings of historians,³⁶ geographers,³⁷ poets³⁸ and mythographers.³⁹

THE GEOMYTHOLOGICAL APPROACH

If it is true, as we have seen so far, that communities settled around the Etna had witnessed volcanic eruptions in multiple occasions, we can also imagine that local oral tradition had kept memories of these occurrences,⁴⁰ either as informative material, as a chronicle, or as the protagonist of didactic and explanatory narratives, such as fables and legends which, taking their cue from actual events, recount the origins of a phenomenon or warn of its danger.⁴¹

Narrative played also a pivotal role in the psychological recovery after a catastrophe, an urge that was surely felt in the aftermath of such a traumatic event.⁴² In Classical Antiquity, the recovery-through-narrative took

³⁴ Arist. *Met.* II, 8, 365b 21-366a 12; II.8 367a 3-17.

³⁵ Emp. A68 = Sen. *QNat.* 3.24.1-3; Emp. B52, Pl. *Phdr.* 112e-113c. See also the discussion in KINGSLEY, 1995, p. 34.

³⁶ Suetonius, for example, mentions the eruption of Mount Etna in 38 to explain why the emperor Caligula abandoned Messina (*Suet. Cal.* 51.1).

³⁷ Strabo VI.2.8.

³⁸ Pind. *Pyth.* I.

³⁹ Ps. *Apollod. Bibl.* I.6.3.

⁴⁰ An important reference concerning the studies on oral tradition is VANSINA, 1985.

⁴¹ CRONIN, CASHMAN, 2007.

⁴² This aspect has been developed especially in the field of Pacific Studies. See for example TAYLOR, 1999.

place under the guise of myth, in which oral tradition with its symbols and meanings powerfully merged, which represented an important tool for guaranteeing the transmission of content and essential community values. Every myth belongs to the society and the culture that invented it, and the cultural cosmos of the community is reflected and echoed in the myth's own narrative structures and characters. Employing a fluid and captivating narrative, myths are thus able to deal with a variety of important aspects.⁴³

Many myths have an aetiological vocation, i.e. they attempt to explain the origin of certain phenomena that have actually been observed. Geo-myths belong to this category: they are narratives of natural events transcribed into mythological terms in order to conceal, in a fairy-tale and intriguing guise, the chronicle of geological, or even catastrophic, events that once took place.

Geo-myths can also be read as environmental accounts, wherein it would be possible to locate traces of ancient memories and awareness.

Geo-myths are now the central focus of an innovative multidisciplinary approach encapsulated by the term 'Geomythology': a modern perspective to the study of myths and legends that was first introduced by the geologist D. Vitaliano in her seminal book *Legends of the Earth: their geologic origins*.⁴⁴ Dororthy Vitaliano developed the geomythological approach, inspired by a publication of A. Galanopoulos⁴⁵ that linked the elaboration of the myth of the disappearance of Atlantis described by Plato with the famous eruption of Santorini in the Bronze Age. S. Marinatos⁴⁶ had already considered the end of the Minoan civilisation as the outcome of this great eruption. She thus had the intuition that reading ancient stories and traditional folktales more carefully could reveal some historical information that had hitherto gone unnoticed. She presented a paper at the 1967 Geology Colloquium at Indiana University entitled *Geomythology. The impact of Geology on History and Legend, with Special Reference to Atlantis*. Her approach was warmly welcomed, and she was encouraged to further her research on this theoretical approach. Geomythology therefore suggests that some myths can refer to natural phenomena and that people have tried to leave a tangible trace of real events, such as natural catastrophes, considered worthy of

⁴³ Academic literature on myth studies is huge. Some essential references are the following: KÉRENYI, JUNG, 1972; DETIENNE, 1981; ELIADE, 1963; DUNDES, 1984; HONKO, 1972; KIRK, 1970. For myth in Classical Antiquity see: KIRK, 1974; VERNANT, 1965; VEYNE, 1983; BURKERT, 1977; GRAVES, 1955.

⁴⁴ VITALIANO, 1973.

⁴⁵ GALANOPOULOS, 1960.

⁴⁶ MARINATOS, 1939.

remembrance for their evocative and suggestive power in mythological accounts. Having pioneered an approach that has gained much traction by a new generation of scholars,⁴⁷ Vitaliano maintains that if we listen carefully, myths can tell us more than we have ever imagined, shedding new light on the relationship between humans and the environment.

The geo-mythological model reshapes the research approach to the field of environmental studies by attributing a new value to oral traditions, now considered as the result of a stratification process of knowledge that could have endured for centuries.⁴⁸ Myths, folkloristic tales and legends thus become a valuable source of information in this specific domain. This, too, happens in contemporary communities that still rely on the oral transmission of knowledge, as well as in earlier cultures. In societies where survival depends strictly on nature, even the slightest change has made great impact, so it was of vital importance to remember and pass on the risks and the strategies once employed.

Assuming that myths are strictly linked to oral tradition,⁴⁹ the information encoded in such stories reflect the culture, habits and history of a population, and, as such, it is not surprising to also find stories about natural catastrophes. These kinds of myths originate from direct witnesses of an orally transmitted event and are relayed through generations to preserve the memory of the phenomenon in potentially affecting the community's survival.

Obviously, there are many kind and type of myths, legends and folktales. In order to identify which of these can be studied by Geomythology, and thus called a geo-myth, certain premises are necessary: the tale must be precisely localised, the protagonists must be linked to the place, and the source of the tale must be local. Three types of geo-myths exist: those of which relate to long-term geological processes, such as sea-level rise and climate change; those recounting abrupt events, such as earthquakes and volcanic eruptions; and those stating a particular and notable landform.

Much information can be obtained by analysing geo-myths. The geo-myths, as we shall see later, can in fact explain the event, ascribed to the action of gods, ancestors and heroes. The tale can also provide a detailed description of the event and explain interesting information, such as the phases of an eruption, the nature of the pyroclastic materials, and the

⁴⁷ PICCARDI, MASSE, 2007.

⁴⁸ VANSINA, 1985.

⁴⁹ See for example CRONIN, CASHMAN, 2007; CASHMAN, CRONIN, 2008; NUNN, 2002; NUNN, 2014; NUNN, LANCINI, FRANKS et al., 2019.

vents involved in the eruption.⁵⁰ It can also fill the gap that geology fails to provide, such as gas releases and other secondary volcanic phenomena.⁵¹ The description contained in the myth may be our only chance to learn about a landform or catastrophic episode, if geological or environmental changes have occurred in the meantime. Thanks to the comparison with archaeological data, many geo-myths can be dated and can thus help in the assessment of a more accurate chronology.⁵² They also stress how people react and recover after a disaster, information that can be integrated into current mitigation strategies in some communities.⁵³ The analytical study of myths and legends thus offers information that would otherwise be ignored and unobtainable through the methods of other disciplines.

Geo-myths encompass tales both from Antiquity and from traditional contemporary societies. In both cases, these stories are the product of oral tradition, which has stratified and crystallised into a codified narrative over time.⁵⁴ This process is much more pronounced in ancient myths, since many centuries separate us from the authors of the stories, and it is not possible to attain feedback from ethnographic fieldwork. So, when we are about to study ancient myths, as it is the case of this paper, greater attention must be placed on the aspect of written transmission. In fact, we only know the ancient myths not in their original form but their written form, through their transcription in medieval *codices*. Moreover, these myths were written in ancient Greek and Latin. Linguistic distance and the history of the text's transmission can contribute to alterations or partial modifications in the meaning of the text we are reading. It is also necessary to establish a network of relationships between the texts and the authors, to understand if there have been influences or emulations and if there is a common source. It is then necessary to identify the main narrative motifs, in order to be able to identify the number of existing variants of the same myth. We will then try to select those invariable and recurring narrative motifs that make it possible to trace the archetype of the story, in order to try to locate it chronologically. The information that deserved to be remembered was encoded, but with a narrative key that facilitated memorisation. As such, it is necessary to identify the narrative motifs that encode geological information and which, after careful analy-

⁵⁰ CRONIN, CASHMAN, 2007.

⁵¹ NUNN, LANCINI, FRANKS et al., 2019; DE BENEDETTI, FUNICIELLO, GIORDANO et al., 2008.

⁵² CRONIN, FERLAND, TERRY, 2004; GALIPAUD, 2002; NUNN, REID, 2016.

⁵³ ARUNOTAI, 2008; SUTTON, PATON, BUERGELT et al., 2020.

⁵⁴ BARBER, BARBER, 2004; VANSINA, 1985.

sis of the geological data, correlate them with the corresponding geological phenomena.

In addition to those already highlighted, there are clearly other problematic aspects inherent in this methodological perspective, whose methods have yet to be perfected and systematised. Moreover, the ancient myth, in its written codified version, lends itself to various interpretations already in Antiquity, especially if the original meaning is no longer clear, and can be reused for other purposes, such as political ones. Another scruple to which attention should be paid is that of not approaching the matter in a deterministic way, trying not to over-interpret or make the sources say more than they really do.⁵⁵ However, it is our belief that this approach, with all its limitations, can provide us with interesting insights, as the case study aims to show.

A CASE STUDY: REPRESENTATION OF VOLCANIC ACTIVITY IN THE TYPHON GREEK MYTH

The present study seeks to understand, through a geomythological investigation, whether the Greeks living in Etna's shadow elaborated a mythological representation of the volcano in action.

To answer this question, we now turn to Hesiod's *Theogony*, one of the oldest Greek epics which, together with Homer's *Iliad* and *Odyssey*, marked the beginning of the systematization of mythological material during the 8-7th century.

1. *Sources relating to the battle between Zeus and Typhon*

In verses 820-880, Hesiod describes the clash between Zeus and Typhon. In Hesiod's *Theogony*, Zeus, before becoming the king of the Olympian gods, whose court was on top of the Olympus mountain, had to fight his own father, Cronus. To resist his young and mighty son, Cronus relied on the help of his numerous brothers, the Titans, sons of Gaia. Precisely because of the slaughter of her sons, the telluric goddess Gaia sought revenge against Zeus himself by unleashing an horrendous creature, Typhon, against the Olympian gods. This monster is described as a frightening being of gigantic size, anguiform, with firing eyes and capable of emit-

⁵⁵ For the relationship between myth and science, mostly concerning cosmology and astronomy, and its problematic aspects, cf. DE SANTILLANA, VON DECHEND, 1983.

ting incomprehensible and horrible bestial cries. This chilling figure comes to Olympus to threaten the gods. Zeus knew well that only he could defeat him. The mighty king of the gods then engages in a deadly fight with Typhon. The earth rumbles, resounds under their blows, trembles, and just as the sky and the sea boil, the waters, illuminated by Zeus's thunderbolt and Typhon's fire, start to burn. For a moment, the outcome of the fiery battle seems uncertain, but in the end, the king of the gods prevails, and striking the enemy with a beam of lightning, he hurls him underground, burning him and setting the surrounding earth on fire, which melts and releases steam. Typhon is now trapped underground in the Tartarus, but his anger is still present.

Many of the images employed by Hesiod in the description of this mythical battle evoke moments of a volcanic eruption, a noteworthy feature that recurs in later versions of the myth from 8th century BC to 6th century AD.⁵⁶ From the fifth century onwards, the myth takes place in Sicily as a result of Etna's essential role.

The ground trembles, shakes, and rumbles. The mountainous slopes collide and shake with noise, the caves bellow, and the earth cracks: "the earth around resounded terribly [...] and there arose an endless shaking";⁵⁷ "the solid earth did sink, and the steady ground of Cilicia shook to its foundations [...]; the flanks of craggy Tauros crashed with a rumbling din, [...] the underground caverns boomed, the rocky headlands trembled, the hidden places shook."⁵⁸

From the mountain, unconquerable fire, torrents of burning smoke, and its red flame devour the Sicilian plains with a roar: "from whose inmost caves belch forth the purest streams of unapproachable fire [...] That monster shoots up the most terrible jets of fire,"⁵⁹ and "shall burst forth rivers of fire [...] boiling rage shall Typhon, although charred by the blazing lightning of Zeus, send spouting forth with hot jets of appalling, fire-breathing surge"⁶⁰ and the action of the monster "obscured the sun."⁶¹

⁵⁶ The main sources, excluding the aforementioned *Theogony* of Hesiod, are Pindar, *Pythian Ode* I. 13-31; Aeschylus, *Prometheus Bound* 349-374; Nonnus of Panopolis, *Dionysiaca* I-II; XIII; Pseudo-Apollodorus, *Library* I.6.3; Philostratus, *Imagines* II.17; Hygin, *Fabulae* 152; 196; Antoninus Liberalis 28; Oppianus, *Halieutica* III. 15-28; Ovidius, *Metamorphosis* V. 346-364.

⁵⁷ Hes. *Theog.* 842; 849.

⁵⁸ Nonnus. *Dion.* II. 34-40.

⁵⁹ Pind. *Pyth.* I.21-2; 25.

⁶⁰ Aesch. *PV* 369-374.

⁶¹ Nonnos, *Dionys.* I. 292.

A hissing, a screeching sound emitted by the monster “hissing out terror with horrid jaws,”⁶² sometimes a roar, a rumble “uttered every kind of sound unspeakable”⁶³ and “hearing the terrible roar from the mane-bristling lions of his giant’s head,”⁶⁴ the screams of the monster who, once fallen, exhales whirlwinds of smoke “in the daytime her rivers roll out a fiery flood of smoke.”⁶⁵

Typhon is also associated with serpentine features quite often, described with torrents of fire that crawl out of its mouth: “fire burned from his heads as he glared”⁶⁶ and “fire flashed from his eyes [...] spouting a great jet of fire from his mouth.”⁶⁷

Typhon hurls burning stones into the sky “then hurled a volley of cliffs”⁶⁸ and eventually mountains “hurling kindled rocks [...] he heaved whole mountains”⁶⁹ or “spues the sands on high”⁷⁰ or tears off pieces of land that become islands and hurls them as weapons or uses the rocks of the mountains to build an unbreakable shelter “the crimson flame hurls rocks down to the deep plain of the sea with a crashing roar”⁷¹ and “broke off an island at the edge of the continent which is the kerb of the brine, circled it round and round, and hurled the whole thing like a ball.”⁷²

Zeus uses the thunder and the lightnings to fight against Typhon, who counters with fire and rocks: the final image portrays “blasts of fire issue from the thunderbolts that were thrown.”⁷³

Despite these varying sources, which also date back to different eras and belong to different literary genres, it is interesting to note that the myth’s central core remains unchanged and that the imagery is the same in all of the texts: there is a crash of catastrophic proportions, the whole earth is involved, fire and flames fill the scene, which can only remind us of a volcanic eruption. In fact, it is quite possible, going through the myth, to find traces of various volcanic phenomena. The flowing rivers of fire

⁶² Aesch. PV 357.

⁶³ Hes. Theog. 830.

⁶⁴ Nonnus. Dion. I. 270-1.

⁶⁵ Pind. Pyth. I.23.

⁶⁶ Hes. Theog. 827, see also Aesch. PV 358.

⁶⁷ Ps. Apoll. I.6.3.

⁶⁸ Nonnos. Dionys. I.261.

⁶⁹ Ps. Apollod. Bibl. I.6.3.

⁷⁰ Ov. Met. V. 353.

⁷¹ Pind. Pyth. I. 23-4.

⁷² Nonnus. Dion. I. 287-90.

⁷³ Ps. Apollod. Bibl. I.6.3.

are evocative of flowing lava, the rocks and ashes that are thrown refer to the debris of an eruption, and the various sounds that can accompany the eruption correspond to the degassing, explosion and seismic quakes that often signal an eruption. This imagery is intended to depict a volcano in action: the numerous snake tails of Typhon could indicate the numerous lava flows, and the fire emitted from the monster's mouth can allude to a volcanic crater. The narrative, through the image of the struggle between the fire monster and the god who masters the thunderbolt, effectively represents the volcanic eruption. Another volcanic phenomenon could explain an image evoked in the story: Zeus's lightning bolts created by the Cyclops in Hephaestus's forge on Mount Etna meet the fire of Typhon, who is about to be struck down. The image envisioned by the Greeks when they constructed the myth could have been the phenomenon of the volcanic lightning,⁷⁴ which had already been observed on Etna. Undoubtedly, its spectacular character was able to equally provoke awe and amazement.

2. *Relating narrative patterns to volcanic features*

Scholars have taken interest in this myth and its link with volcano Etna. Indeed, the geologist M.T. Greene considers this myth "the faithful portrayal of the eruptive signature' and physical description of that mountain."⁷⁵

This raises the question of whether the myth refers to a specific episode or whether it reflects the general volcanic character of the mountain that overlooked the Greek colonies.

For example, our earliest source of the struggle between Typhon and Zeus, Hesiod, may have learned of the effects of Etna's eruption or of other volcanoes from the Euboeans travellers during his stay in Euboea (a huge Greek island in the Aegean Sea separated from the mainland by a narrow strait).⁷⁶ The Euboeans were in fact the first to establish trade contacts with the Near East, a land also frequently marked by volcanoes and permeated with legends very similar to that of Typhon. The Euboeans were also the first to settle in Magna Graecia and Sicily, where they witnessed other volcanic phenomena.⁷⁷ All of this knowledge, delivered in the form of oral tradition, may have reached Hesiod, who was the first to produce a version of

⁷⁴ McNUTT, WILLIAMS, 2010 develop an analysis of this phenomenon taking into account data from more than 80 volcanoes.

⁷⁵ GREENE, 1992, p. 66.

⁷⁶ WALCOT, 1966.

⁷⁷ See BATS, D'AGOSTINO, 1998; D'AGOSTINO, 2006; RIDGWAY, 1992 for a discussion on the role of Euboeans in Greek Colonization.

the Typhon myth as a representation of the volcanic eruption. Hesiod does not explicitly mention Etna, but certain scholars, such as Guidoboni et al. and M.T. Greene, assert that the myth was inspired by an eruption of Etna.

Guidoboni⁷⁸ link Hesiod's text to the first of the eruptions mentioned by Thucydides⁷⁹ to establish a chronological range from 734 BC (the *terminus post quem* for Thucydides' first eruption) and the middle of the 7th century BC, the period of Hesiod's activity. For the chronology of this Hesiodic eruption, Greene proposes either the first of the eruptions mentioned by Thucydides, or around 1500 BC, when an eruption would have forced the Sicans' departure from the island.⁸⁰

Certainly, though not for every source, it is possible to find a perfect 'geological' match in the form of an accurately dated volcanic eruption. The tale of Typhon's defeat can be considered nevertheless a geo-myth, considering its frequent recurrence in the pages of so many authors throughout the whole of antiquity. In every version of this mythological battle, Typhon represents, in a more or less structured symbolic way, a volcano in action. Of all the authors that have been mentioned, Pindar and Aeschylus require elaboration. Both of these authors were present at the court of Hieron of Syracuse between 478 and 466 BC, and both included the myth of Typhon in their works: Pindar in his laudatory work in honour of Hieron's victory in the chariot race at the games of Delphi, Aeschylus in his tragedy *Prometheus Bound*.⁸¹ The inclusion of this myth does not clash with either the tone or the theme of the two works, but a specific factor may have led to the choice of this motif. Indeed, it was precisely in those years that Mount Etna erupted in a frightening manner, according to Thucydides in 475-4 BC⁸² and to the Parian Marble in 479-8 BC.⁸³ An event powerful enough to be recorded in two sources must have had strongly impacted the entire population, as well as on the two authors working at

⁷⁸ GUIDOBONI, CIUCCARELLI, MARIOTTI et al., 2014, p. 12.

⁷⁹ Thuc. III.116.1-3: "In the first days of this spring, the stream of fire issued from Etna, as on former occasions, and destroyed some land of the Catanians, who live upon Mount Etna, which is the largest mountain in Sicily. [2] Fifty years, it is said, had elapsed since the last eruption, there having been three in all since the Hellenes have inhabited Sicily. [3] Such were the events of this winter; and with it ended the sixth year of this war, of which Thucydides was the historian."

⁸⁰ Diod. V.6.2-3. See GREENE, 1992, pp. 63-72.

⁸¹ Neither the date nor the place of performance of the *Prometheus*, dated between 467 and 458, is clear, but Aeschylus did produce for Hieron in those years (476-5) the tragedy *The Etneans*, composed in honour of the foundation of the new colony Etna by Hieron.

⁸² Thuc. III.116.

⁸³ I.G. XII, 5, 444. It's an inscribed Greek chronology.

Hieron's court. Including the theme of Typhon therefore allowed Aeschylus and Pindar to use an image with a strong visual and psychological-emotional impact that could trigger, in the minds of their local audiences, the memory of the erupting volcano's fury and violence and thus accentuate the impact of their song. If both refer to the same image, we can assume that it was to be easily recognised by the audience.

Therefore, in the case of Pindar and Aeschylus, who were the first to clearly locate Typhon under Etna, the myth was inspired by a clearly identifiable event. Over time, this identification modelled into a literary *topos*, to indicate a generic volcanic action of Etna and, by extension, the symbolic representation of other volcanic contexts, so that, we also find Typhon in Cilicia,⁸⁴ Lydia,⁸⁵ Phrygia,⁸⁶ Ischia⁸⁷ and the Phlegrean Fields⁸⁸ in known literary sources.

According to the analysis of all these sources, we can presume that the image of a fearful anguiped monster fighting against a god mastering the thunderbolt was widespread in pre-literary times, like an archetype, as it appears in many societies.⁸⁹ Graeco-Roman civilization shaped this volcanic monster as Typhon probably borrowing some motifs from Asia Minor, where the Greeks had early contacts. As such, we can argue that, initially, people identified the strength, the fear and the danger of the volcano in Typhon and that this image cemented afterwards. If on the one hand Typhon became a model to represent this geologic manifestation, on the other hand this image and association became so powerful that in late literature, the appearance of the monster outlines not a specific catastrophe, but rather his power to evoke fear and danger.

CONCLUSION

This study has attempted to identify how the ancients represented Etna. We are not aware of any figurative representations of the volcano, but we

⁸⁴ Pind. Pyth. I.17; Aesch. PV 351, Ps. Apollod. Bibl. I.6.3.

⁸⁵ Strabo XIII.4.11.

⁸⁶ Diod. Sic. V.71.2.

⁸⁷ Luc. Phars. V, 93-101; Lycoph. 688-693; Sil. Pun. VIII.540-541; Verg. Aen. IX.713-716. Cilicia, Lydia and Phrygia are some of the ancient names given to some regions of Asia Minor.

⁸⁸ Val. Fl. VI.168s.

⁸⁹ For example, we can find in the Hittite-Hurrian mythology the fighting between Ulikummi and Teshub, or between Illuyanka and Teshub. The miteme of the struggle to represent volcanic eruption is localized in many volcanic areas, as we can see in Fiji for example NUNN, 1999; LANCINI, NUNN, NANUKU et al., 2020.

have identified how the image of its danger has been ingeniously conveyed through myth. Legends and myths, which find their origin in oral tradition, offer insight into thinking and conceptualizing the nature that precedes scientific speculation.

Analyzing the myth reveals unexpected clues. If we investigate the image that the sources convey of Typhon, we may concur that they all represent him as a monstrous, feral, multi-limbed being, in which every physical and psychological feature focuses on excess and exaggeration. The sources also unanimously agree on his anguiped physique. According to the more detailed portrait given by Pseudo-Apollodorus, snakes dominate the scene:

One of his hands reached out to the west and the other to the east, and from them projected a hundred dragons' heads. From the thighs downward he had huge coils of vipers, which when drawn out, reached to his very head and emitted a loud hissing. His body was all winged [...].⁹⁰

The serpentine appearance is not only characteristic of Typhon but also of other fire-related creatures in Greek mythology.⁹¹ But the image of crawling fire evidently recurs also in other cultures, where monsters and supernatural beings linked to fire are represented as anguiped as well. This leads us to suspect that the presence of snakes in the description of Typhon is not accidental, but suggests his close relation to volcanic fire. Indeed, we have previously proposed that the coils of the serpent could be interpreted as the movement and the shape of flowing lava in the case of effusive eruptions.

Another piece of evidence supports this hypothesis.

Also mentioned at the beginning of this article was the fresco in the House of the Centenary in Pompeii, in which a large, disproportionate serpent is painted at the foot of Vesuvius.

While the snake was a very recurrent image in Pompeii figurative arts, this motif was also evidently popular also in nearby towns and settlements. In particular, we can compare our fresco with a painting from Herculaneum, in which a snake wrapped around an altar is introduced by the inscription "Genius / huius loci / montis", i.e. "the genius of this mountainous place,"⁹² with clear reference to Vesuvius.

If the serpent is the Genius, the tutelary deity, of Vesuvius, then perhaps the oversized serpent is placed as an important counterpoint to the image

⁹⁰ Ps. Apollod. Bibl. I.6.3.

⁹¹ See OGDEN, 2013a; OGDEN, 2013b; FONTENROSE, 1980; WATKINS, 1995.

⁹² CIL (Corpus Inscriptionum Latinarum) 04, 01176 (p 204, 462) = D 03649 (p 181) = Wachter-2019, 00005 (WACHTER, 2019).

of Vesuvius in the Pompeii fresco. The image of the volcano symbolized by a snake also reminds us of Typhon himself, represented throughout his history as a monster covered in snakes. If the serpent can bring to mind the volcano, then Typhon can also symbolically represent the eruption in the pictorial representations of Greek art.

From the earliest depiction of him on Corinthian alabasters in the 7th century BC,⁹³ Typhon is often depicted as a winged and certainly anguiped creature. In various pictorial representations, it is possible to find the very same motifs that emerge in written sources. In Etruscan artefacts, the monster throws rocks,⁹⁴ and in the famous Apulian oinochoe in the British Museum,⁹⁵ the scene seems to directly recall the narration of Pseudo-Apollodorus. Zeus is on a chariot with Hermes and is about to hurl the thunderbolt, while ahead of him, Typhon carries a large rock on his head. Several interpretations are possible,⁹⁶ but the most likely one suggests that the scene represents the final moment of the myth in which the monster tries to counterattack the king of the gods with flames, probably represented by the blowing face, while the rock could also represent the missile with which Typhon tries to defend himself, or symbolize Mount Etna's burying of the monster.

Therefore, we conclude that not only was Typhon the Greek mythological representation of volcanoes, but the snake, which is always related to this mythical monster as an element of his figure, could also surely be surely an image of or an allusion to volcanic activity. Whenever symbolic language and images play a role, whether in figurative art or in literary production, Typhon and the snake recur as powerful symbols for volcanic activity.

The divine fight between Zeus and Typhon brings this conclusion to its extreme: beyond the cosmic struggle between the two god-like creatures lies an extremely detailed description of a volcanic eruption.

Following a geo-mythological approach, we can finally argue that tales play an important role in ancient communities, encoding observations of volcanic activity and environmental changes. In pre-classical antiquity, myths represented one of the ways to understand and explain the world, and it is a form that facilitates and enhances the memorization and transmission of important information through generations. The character of

⁹³ LIMC Typhon 1-10 (Lexicon Iconographicum Mythologiae Classicae).

⁹⁴ VIAN, 1951, n° 5, 6, 8 pl. II.

⁹⁵ Ibid., n° 12 pl. II; LIMC Typhon 15.

⁹⁶ See LINANT DE BELLEFONDS, 2014.

Typhon meets the need to signal precautions about the dangers of volcanic hazards, and its evocative power is so strong that it has become a model and a narrative *topos* in reference to volcanic contexts.

REFERENCES

- ALCOLAT Delphine, 2017. "'De terra exit flamma.' Productions souterraines, éléments ignés, formes et phénomènes d'origine volcanique décrits par les auteurs antiques: de la curiosité à la tentative d'analyse scientifique," *Travaux du Comité français d'Histoire de la Géologie (COFRHIGÉO)*, 3ème S., 31, pp. 1-23.
- ARUNOTAI Narumon, 2008. "Saved by an Old Legend and a Keen Observation. The Case of Moken Sea Nomads in Thailand," in Shaw R., Uy N., Baumwoll J. (eds.), *Indigenous Knowledge for Disaster Risk Reduction: Good Practices and Lessons Learnt from the Asia-Pacific Region*, Bangkok, UNISDR Asia Pacific Regional Office, pp. 73-78.
- BARBER Elizabeth Jane Wayland, Paul BARBER, 2004. *When they severed earth from sky: how the human mind shapes myth*, Princeton, N. J., Princeton University Press.
- BATS Michel, Bruno D'AGOSTINO (a cura di), 1998. *Euboica: l'Eubea e la presenza euboica in Calcidica e in Occidente, Atti del convegno internazionale di Napoli, 13-16 novembre 1996*, Napoli, Centre Jean Bérard, Dipartimento del Mondo classico.
- BERARD Jean, 1957. *La colonisation grecque de l'Italie méridionale et de la Sicile dans l'Antiquité: l'histoire et la légende*, Paris, Presses universitaires de France.
- BERTI Nadia, 1989. "Catania e le eruzioni dell'Etna nel II secolo a.C.," in Marta Sordi (a cura di), *Fenomeni naturali e avvenimenti storici nell'antichità*, Milano, Vita e Pensiero, pp. 87-102.
- BRANCA Stefano, CONDOMINES Michel, TANGUY Jean-Claude, 2015. "Flank eruptions of Mt Etna during the Greek-Roman and Early Medieval periods: New Data from Ra-226-Th-230 dating and archaeomagnetism," *Journal of Volcanology and Geothermal Research*, 304, pp. 265-271.
- BRANCA Stefano, DEL CARLO Paola, 2004. "Eruptions of Mt. Etna during the past 3,200 Years: A Revised Compilation Integrating the Historical and Stratigraphic Records," in Alessandro Bonaccorso, Sonia Calvari, Mauro Coltelli et al. (eds.), *Mt. Etna: Volcano Laboratory*, Washington DC, American Geophysical Union, pp. 1-27.
- BURKERT Walter, 1977. *Griechische Religion der archaischen und klassischen Epoche*, Stuttgart, Berlin, Köln, Mainz, Kohlhammer.
- CASHMAN Katherine V., CRONIN Shane J., 2008. "Welcoming a Monster to the World: Myths, Oral Tradition, and Modern Societal Response to Volcanic Disasters," *Journal of Volcanology and Geothermal Research*, 176, pp. 407-418.
- COLTELLI Mauro, DEL CARLO Paola, VEZZOLI Luigina, 1998. "Discovery of a Plinian Basaltic Eruption of Roman age at Etna Volcano, Italy," *Geology*, 26, pp. 1095-1098.
- COLTELLI Mauro, DEL CARLO Paola, VEZZOLI Luigina, 2000. "Stratigraphic constraints for explosive activity in the past 100 ka at Etna Volcano, Italy," *International Journal of Earth Sciences*, 89, pp. 665-677.
- CRONIN Shane J., CASHMAN Katherine V., 2007. "Volcanic oral traditions in hazard assessment and mitigation," in John Grattan, Robin Torrence (eds.), *Living Under the Shadow. Cultural Impacts of Volcanic Eruptions*, New York, Routledge, pp. 175-202.

- CRONIN Shane J., FERLAND Marie A., TERRY James P., 2004. "Nabukelevu volcano (Mt. Washington), Kadavu – a source of hitherto unknown volcanic hazard in Fiji," *Journal of Volcanology and Geothermal Research*, 131, pp. 371-396.
- D'AGOSTINO Bruno, 2006. "The First Greeks in Italy," in Gocha R. Tsetskhladze (ed.), *Greek Colonisation. An Account of Greek Colonies and Other Settlements Overseas*, Leiden-Boston, Brill, pp. 201-237.
- DE BENEDETTI Arnaldo A., FUNICIELLO Renato, GIORDANO Guido et al., 2008. "Volcanology, History and Myths of the Lake Albano Maar (Colli Albani volcano, Italy)," *Journal of Volcanology and Geothermal Research*, 176, pp. 387-406.
- DE SANTILLANA Giorgio, VON DECHEND Hertha, 1983. *Il mulino di Amleto. Saggio sul mito e sulla struttura del tempo*, Milano, Adelphi.
- DETENNE Marcel, 1981. *L'invention de la mythologie*, Paris, Gallimard.
- DUNDES Alan (ed.), 1984. *Sacred Narrative, Readings in the Theory of Myth*, Berkeley, University of California Press.
- ELIADE Mircea, 1963. *Myth and Reality*, New York, Harper and Row.
- FONTENROSE Joseph E., 1980. *Python. A Study of Delphic Myth and its Origins*, Berkley, Los Angeles, London, University of California Press.
- GALANOPOULOS Angelos G., 1960. "On the Origin of the Deluge of Deucalion and the Myth of Atlantis," *Athenais Archaïologike Hetaireia*, 3, pp. 226-231.
- GALIPAUD Jean-Christophe, 2002. "Under the Volcano: Ni-Vanuatu and their Environment," in Robin Torrence, John Grattan (eds.), *Natural Disasters and Cultural Change*, London, Routledge, pp. 162-171.
- GRAVES Robert, 1955. *The Greek Myths*, Harmondsworth, Penguin.
- GREENE Mott T., 1992. *Natural Knowledge in Preclassical Antiquity*, Baltimore-London, John Hopkins University Press.
- GUIDOBONI Emanuela, CIUCCARELLI Cecilia, MARIOTTI Dante et al., 2014. *L'Etna nella storia. Catalogo delle eruzioni dall'antichità alla fine del XVII secolo*, Bologna, Bononia University Press.
- GUITTARD Charles, 2004. "La représentation des volcans chez Lucrèce," in Éric Foulon (éd.), *Connaissance et représentations des volcans dans l'Antiquité: actes du colloque de Clermont-Ferrand, Université Blaise Pascal, 19-20 septembre 2002*, Clermont-Ferrand, Presses universitaires Blaise Pascal, pp. 259-269.
- HARRY Hine M., 2002. "Seismology and Vulcanology in Antiquity?," in Christopher J. Tuplin, Tracey E. Rihl (eds.), *Science and Mathematics in Ancient Greek Culture*, Oxford, Oxford University Press, pp. 56-75.
- HONKO Lauri, 1972. "The Problem of Defining Myth," *Scripta Instituti Donneriani Aboensis*, 6, pp. 7-19.
- KÉRENYI Károly, JUNG Carl G., 1972. *Prolegomeni allo studio scientifico della mitologia*, Torino, Boringhieri.
- KINGSLEY Peter, 1995. *Ancient Philosophy, Mystery, and Magic. Empedocles and Pythagorean Tradition*, Oxford, Clarendon Press.
- KIRK Geoffrey S., 1970. *Myth: its Meaning and Functions in Ancient and other Cultures*, Berkeley, Los Angeles, Cambridge University Press.
- KIRK Geoffrey S., 1974. *The Nature of Greek Myths*, Harmondsworth, Pelican.
- LANCINI Loredana, NUNN Patrick D., NANUKU Meli et al., 2020. "Oral and Written Accounts of the Volcanic Eruption of Nabukelevu (Mt Washington), Kadavu Island (Fiji) per-

- haps ~2000 Years Ago: Volcanological, Cultural and Cognitive Insights,” submitted for publication.
- LE BLAY Frédéric, 2006. “Le poème latin sur l’Etna. Témoin d’un savoir oublié,” in Christophe Cusset (éd.), *Musa docta. Recherches sur la poésie scientifique dans l’Antiquité*, Saint-Etienne, Publications de l’Université de Saint-Etienne, pp. 335-361.
- LINANT DE BELLEFONDS Pascale, 2014. “Typhée et le volcan: à propos de l’œnochoé du British Museum F237,” in Pascale Bádenas de la Peña, Paloma Cabrera Bonet, Margarita Moreno Conde et al. (eds.), *Homenaje a Ricardo Olmos. Per speculum in aenigmate Miradas sobre la Antigüedad*, Madrid, ACHH, pp. 109-115.
- LUISI Aldo, 1989. “L’esplosione del Vesuvio del 79 d.C.,” in Marta Sordi (a cura di), *Fenomeni naturali e avvenimenti storici nell’antichità*, Milano, Vita e Pensiero, pp. 227-236.
- MARINATOS Spyridon, 1939. “The Volcanic Destruction of Minoan Crete,” *Antiquity*, 13, pp. 425-439.
- McNUTT Stephen R., WILLIAMS Earle R., 2010. “Volcanic Lightning: Global Observations and Constraints on Source Mechanisms,” *Bulletin of Volcanology*, 72, pp. 1153-1167.
- NAZZARO Antonio, 2009. *Il rischio Vesuvio. Storia e geodiversità di un vulcano*, Napoli, Alfredo Guida Editore.
- NUNN Patrick D., 1999. “Early human Settlement and the Possibility of contemporaneous Volcanism, Western Kadavu, Fiji,” *Domodomo. A Scholarly Journal of the Fiji Museum*, 12, pp. 36-49.
- NUNN Patrick D., 2002. “On the Convergence of Myth and Reality: Examples from the Pacific Islands,” *The Geographical Journal*, 167, pp. 125-138.
- NUNN Patrick D., 2014. “Geohazards and Myths: Ancient Memories of rapid coastal Change in the Asia-Pacific Region and their Value to future Adaptation,” *Geoscience Letters*, 1/3, pp. 1-11.
- NUNN Patrick D., LANCINI Loredana, FRANKS Leigh et al., 2019. “Maar Stories: How Oral Traditions Aid Understanding of Maar Volcanism and Associated Phenomena during Pre-literate Times,” *Annals of the American Association of Geographers*, 109, pp. 1618-1631.
- NUNN Patrick D., REID Nicholas J., 2016. “Aboriginal Memories of Inundation of the Australian Coast Dating from More than 7000 Years Ago,” *Australian Geographer*, 47, pp. 11-47.
- OGDEN Daniel, 2013a. *Dragons, Serpents, and Slayers in the classical and early Christian Worlds: a Sourcebook*, Oxford, New York, Auckland, Oxford University Press.
- OGDEN Daniel, 2013b. *Drakon: Dragon Myth and Serpent Cult in the Greek and Roman Worlds*, Oxford, Oxford University Press.
- PICCARDI Luigi, MASSE W. Bruce, 2007. *Myth and Geology*, London, Geological Society of London.
- PUGLIESE CARRATELLI Giovanni (a cura di), 1999. *Pompei: pitture e mosaici*, vol. 11, Roma, Istituto della Enciclopedia Italiana.
- RIDGWAY David, 1992. *The First Western Greeks*, Cambridge, Cambridge University Press.
- SCHMITT Axel K., DANIŠÍK Martin, AYDAR Erkan et al., 2014. “Identifying the Volcanic Eruption Depicted in a Neolithic Painting at Çatalhöyük, Central Anatolia, Turkey,” *PLOS ONE*, 9, e84711.
- STOTHERS Richard B., RAMPINO Michael R., 1983. “Volcanic Eruptions in the Mediterranean before AD 630 from a Written and Archaeological Sources,” *Journal of Geophysical Research*, 88, pp. 6357-6371.

- SUTTON Stephen A., PATON Douglas, BUERGELT Petra et al., 2020. "What's in a Name? 'Smong' and the Sustaining of Risk Communication and DRR Behaviours as Evocation Fades," *International Journal of Disaster Risk Reduction*, 44, p. 101408.
- TANGUY Jean-Claude, CONDOMINES Michel, BRANCA Stefano et al., 2012. "New Archeomagnetic and Ra-226-Th-230 Dating of Recent Lavas for the Geological Map of Etna Volcano," *Italian Journal of Geosciences*, 131, pp. 241-257.
- TAYLOR Antony James William, 1999. "Value Conflict Arising from a Disaster," *Australasian Journal of Disaster and Trauma Studies*, 3/2.
- TSETSKHLADZE Gocha R. (ed.), 2006. *Greek Colonisation: an Account of Greek Colonies and other Settlements Overseas*, Leiden-Boston, Brill.
- VANSINA Jean, 1985. *Oral Tradition as History*, Madison, University of Wisconsin press.
- VERNANT Jean-Pierre, 1965. *Mythe et pensée chez les grecs. Etudes de psychologie historique*, Paris, Éditions Maspero.
- VEYNE Paul, 1983. *Les Grecs ont-ils cru à leur mythes? Essai sur l'imagination constituante*, Paris, Éditions du Seuil.
- VIAN Francis, 1951. *Répertoire des gigantomachies figurées dans l'art grec et romain*, Paris, Klincksieck.
- VITALIANO Dorothy B., 1973. *Legends of the Earth: their Geologic Origins*, Bloomington-London, Indiana University Press.
- WACHTER Rudolf, 2019. *Pompejanische Wandinschriften: lateinisch-deutsch*, Berlin, De Gruyter.
- WALCOT Peter, 1966. *Hesiod and the Near East*, Cardiff, Wales University press.
- WATKINS Calvert, 1995. *How to Kill a Dragon. Aspects of Indo-European Poetics*, New York-Oxford, Oxford University Press.
- WOLFF Étienne, 2004. "L'image de l'Etna dans l'anonyme Aetna," in Éric Foulon (éd.), *Connaissance et représentations des volcans dans l'Antiquité: actes du colloque de Clermont-Ferrand, Université Blaise Pascal, 19-20 septembre 2002*, Clermont-Ferrand, Presses universitaires Blaise Pascal, pp. 79-84.

Direttore responsabile: prof. Stefano Carrai

Registrazione del Tribunale di Firenze n. 4026 del 6 novembre 1990

ISSN 0031-9414

FINITO DI STAMPARE
PER CONTO DI LEO S. OLSCHKI EDITORE
PRESSO ABC TIPOGRAFIA • CALENZANO (FI)
NEL MESE DI NOVEMBRE 2021