

Historical Anthropology of a Catastrophe: The Huaynaputina eruption in 1600 and its cultural dimensions

1. Introduction: Catastrophe and calamity in the early modern Andes

The outbreak of the Huaynaputina in 1600 caused the death of about 1,500 people, devastated a large region in the south of Peru, killing livestock, destroying vineyards and fields and bringing about an almost total loss of the harvest and a serious decline of the economy. Despite its devastating effects, the 1600 eruption was only the largest explosion of the stratovolcano in colonial times. As the shape of the Huaynaputina shows, there must have been substantial volcanic events before the 1600 explosion which blew away the upper part of the mountain.¹ Moreover, there have been several eruptions during the colonial period by the nearby volcanoes Misti, located in the immediate neighbourhood of the southern Peruvian town of Arequipa at a distance of approximately 15 km to the east and Ubinas another 50 km further to the east.² The last strong eruption of the Misti (16°18'S 71°24'W) probably occurred between 1438 and 1471 that means before the Spaniards arrived in 1532. During colonial times and until recently the volcano was active. With a summit elevation of 5822 m the Misti is considerably higher than the Huaynaputina (16°35'S 70°52'W) with 4800 m.³ The Ubinas (16°22'S 70°54'W) has a summit elevation of 5675 m and has been active through the colonial era with reported eruptions in 1662, 1677, 1784, and several others during the nineteenth century. The last eruptions occurred in 1956 and 1969.⁴ All three volcanoes form a sort of triangle and are situated in the northern part of the Central Volcanic Zone of the Andes which runs between latitudes 14° and 28°S.⁵ Silva and Francis list 44 major active volcanoes for this area.⁶

The magnitude of the Huaynaputina eruption has been only recognized in more recent research. Tom Simkin's catalogue of 1981 still gives a Volcanic Explosivity Index (VEI) for the Huaynaputina eruption of 4.⁷ While in comparison with VEI 3 and/or 2 for the Misti and Ubinas, Huaynaputina's VEI 4 takes the more violent explosion into account⁸, modern studies identified the Huaynaputina explosion in 1600 as a VEI 6-eruption that means a very large, "Plinian" event.⁹ Sim-

¹ J.-C. Thouret, E. Juvigné, A. Gourgaud, P. Boivin, J. Dávila, "Reconstruction of the AD 1600 Huaynaputina eruption based on the correlation of geologic evidence with early Spanish chronicles." *Journal of Volcanology and Geothermal Research* 115, 2002, pp.529-570, p.567-568.

² Thérèse Bouysse-Cassagne, con la colaboración de Philippe Bouysse, *Lluvias y cenizas: dos Pachacuti en la historia*, La Paz, Bolivia: HISBOL (Biblioteca Andina, 4), 1988, 139; Thouret, Juvigné, Gourgaud, Boivin, Dávila, "Reconstruction", p.568.

³ Shanaka L. de Silva, Peter W. Francis, *Volcanoes of the Central Andes*, Berlin et al.: Springer-Verlag, 1991, p.31, 139.

⁴ Bouysse-Cassagne, Bouysse, *Lluvias*, p. 143 Fig. 5; Silva, Francis, *Volcanoes*, p.34.

⁵ Bouysse-Cassagne, Bouysse, *Lluvias*, p.141 Fig. 8, 143 Fig. 5.

⁶ Silva, Francis, *Volcanoes*, p.4.

⁷ Tom Simkin, Lee Siebert, Lindsay McClelland, David Bridge, Christopher Newhall, John H. Latter, *Volcanoes of the World. A Regional Directory, Gazetteer, and Chronology of Volcanism During the Last 10,000 Years*, Stroudsburg, Pennsylvania: Smithsonian Institution, Hutchinson Ross Publishing Company, p.99.

⁸ Simkin et al., *Volcanoes*, p.98-99.

⁹ Nancy K. Adams, Shanaka L. de Silva, Stephen Self, Guido Salas, Steven Schubring, Jason L. Permenter, Kendra Arbesman, "The physical volcanology of the 1600 eruption of Huaynaputina, southern Peru." *Bulletin of Volcanology* 62, 2001, pp.493-518, p.494-495 ; Thouret, Juvigné, Gourgaud, Boivin, Dávila, "Reconstruction", p.529.

kin's catalogue lists only 16 VEI 6-eruptions and a single VEI 7 activity, the Tambora eruption in 1815.¹⁰ Modern scientific methods of consulting the “archives of the earth” allow more thorough analysis of volcanic activities in the past.¹¹ Analysis of tree ring and ice core data showed that the Huaynaputina eruption was also responsible for the most severe short-term cooling event of the past 600 years. In 1601 the Northern Hemisphere suffered from extremely cold summer temperatures, causing crop failure and other calamities.¹²

Apart from the volcanic catastrophes, other natural disasters afflicted the population of the viceroyalty of Peru throughout the early modern period. Earthquakes, sometimes in combination with volcanic activity occurred very often in the Andes. Floods, landslides, and draughts were also listed among the calamities to which the population of colonial Peru was exposed.¹³ Catastrophes are certainly not easier to digest if they happen more frequently, but the necessity to respond to the disastrous effects and tackle with the problems accounts for the early development of strategies to overcome the chaotic situation and reconstruct the community in the Andes.

2. The event: Chronology of the Huaynaputina catastrophe

On 19th of February 1600, the eruption of the Huaynaputina devastated the region of Arequipa praised hitherto an “earthly paradise” because of its fertile land and hospitable climate. The explosion was preceded on 15th of February by seismic activity in the town of Arequipa with growing frequency and intensity until the afternoon of Friday February 18th when it started to destroy houses. In Arequipa, at a distance of 70 km from the volcano, approximately 200 houses were ruined by the earthquakes in 24 hours. It seems that the explosion of the Huaynaputina took place around five p.m. on Saturday 19th of February. It was accompanied by further violent earthquakes in Arequipa and plunged the town into sudden darkness. Terrible noise of the explosion, roars as coming from the depth of the earth, flashes of lightning, electric shocks, and above all an intense shower of ash seemed to announce the end of the world. This went on during all night until dawn of Sunday 20th of February. By then the coat of volcanic ash had reached about 20 centimetres provoking many roofs to collapse under its weight. Early in the afternoon the same day another eruption occurred, producing again darkness and shower of ash. A third explosive sequence followed during the night, lasting until Monday morning. The sky took an intense red colour and seemed to be set on fire. At the same time almost complete darkness involved the inhabitants of the town. This went on for several days until on Friday morning 25th of February a second series of eruptions started. The sky was black, earthquakes and a roaring sound succeeded each other and ash fall con-

¹⁰ Simkin et al., *Volcanoes*, n.p.

¹¹ Wolfgang Behringer, *Kulturgeschichte des Klimas: Von der Eiszeit bis zur globalen Erwärmung*. München: C. H. Beck, 2007, 19-23..

¹² K. R. Briffa, P. D. Jones, F. H. Schweingruber, T. J. Osborn, “Influence of volcanic eruptions on Northern Hemisphere summer temperature over the past 600 years.” *Nature* Vol. 393, 1998, pp. 450-455; David M. Pyle, “How did the summer go?” *Nature* Vol. 393, 1998, pp.415-417; Shanaka L. de Silva, Gregory A. Zielinski, “Global influence of the AD 1600 eruption of Huaynaputina, Peru.” *Nature* Vol. 393, 1998, pp.455-458.

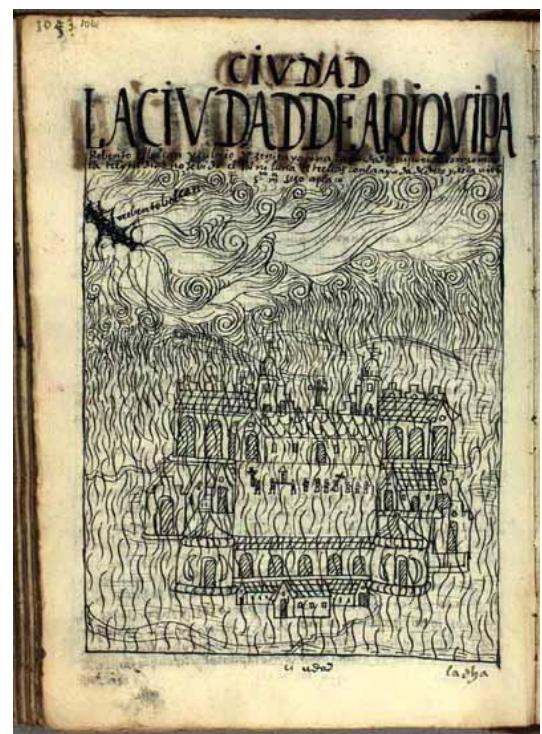
¹³ See the catalogue of natural disasters in: María Eugenia Petit-Breuilh Sepúlveda, *Desastres naturales y ocupación del territorio en Hispanoamérica (siglos XVI al XX)*. Huelva: Universidad de Huelva, 2004, 35-85.

tinued. In the morning of Saturday February 26th, the darkness persisted, but the roaring and earthquakes were increasing until reaching a critical stage: vertical seismic movements of two metres have been reported. The cathedral of Arequipa collapsed during Mass burying the crowd under its debris. Sunday, Monday, and Tuesday February 29th the inhabitants of Arequipa lived in constant darkness under continuous ash fall and threatened by earthquakes. According to an eye-witness, the 1st of March an opening suddenly appeared at the foot of the mountain giving way to a river of fire which reduced everything in its way to ash. On Thursday 2nd of March another violent earthquake shattered the town of Arequipa. In the afternoon of Friday 3rd of March the dark veil lifted for three hours and for the first time since the eruption a glimpse of the sun could be caught. Finally on April 12th the sun appeared again, but it lasted another eight months to return to normal life.¹⁴

Descriptions of the events during the eruptive activity of the Huaynaputina in the majority were reported by people from Arequipa. Indigenous settlements nearby the volcano were completely destroyed and only those who had had a chance to escape from the immediate danger could survive.

For example Omate, a village of 1,200 inhabitants in the proximity of the volcano was completely buried under pumice stone and ash. Several smaller villages also disappeared covered by volcanic debris.¹⁵ Huaynaputina, the “young volcano” in Quechua, devastated villages, vineyards and the cities of Arequipa and Moquegua. The explosion of the stratovolcano had blown away the upper part of the mountain and was still heard in the capital Lima at a distance of 850 km. 1,500 people were killed almost instantly and at least through the seventeenth century Arequipa did not recover from the catastrophe.¹⁶

Archival sources refer to the enormous economic loss the eruption of the Huaynaputina caused in Arequipa and neighbouring regions. A report of church administration, for example, noted a dramatic fall in tithes for the years following the Huaynaputina eruption.¹⁷ Arequipa depended for the most part on its agricultural economy, especially wine-growing, viniculture and wine-trade. Before 1600 in three valleys near Arequipa 200,000 bottles were produced. In 1601 the production



¹⁴ Bouysse-Cassagne, Bouysse, *Lluvias*, p.145-150. The drawing by indigenous author and historian Felipe Guamán Poma de Ayala [1615] shows the city of Arequipa during the ash fall (Felipe Guamán Poma de Ayala [c.1615], *Nueva Corónica y Buen Gobierno*, (Travaux et Mémoires de l'Institut d'Ethnologie, 23). Paris: 1936, f.1053).

¹⁵ Bouysse-Cassagne, Bouysse, *Lluvias*, p.150.

¹⁶ Bouysse-Cassagne, Bouysse, *Lluvias*, p.150; Thouret et al., “Reconstruction”, p.567-568.

¹⁷ “Información de la diminución y quebra....”1612. Archivo General de Indias (AGI), Lima 312, s. fol. For the region of Arequipa the document reports a decrease of 15,881 pesos from the year 1600 to 1604. This means there was a loss of more than the third part of tithes. More dramatically the coca tithes of the valley of Cuzco which was part of the affected area fell from 56,281 pesos in 1590 to 13,760 in 1609.

fell to 10,000 bottles of second class.¹⁸ The point was not just to raise the production in the following years. Great part of the vineyards was completely lost and new grapevines had to be planted. That means viticulture would need some five or six years until wine could again be produced. Corn and wheat could recover more easily, but no harvest could be expected for the year 1600. It was also doubtful, if there would be better conditions for the agricultural economy in 1601, because in the Arequipa region the soil was covered with a layer of ashes which exceeded a meter. Corn prices had increased in an exorbitant way and the products had to be brought from as far away as Cuzco. Inhabitants of Arequipa who survived the catastrophe had to sell jewellery and other objects of value to purchase food. A major problem of the city council and the settlers of Arequipa was the labour shortage. Many indigenous people had been killed or had fled from the region. Indigenous labour force was, however, the backbone of the Spanish colonial system and essential for the reconstruction of Arequipa. The city administration therefore asked the authorities for more indigenous workers. The petitions were conceded, but nonetheless it took more than a year to rebuild the town.¹⁹

3. Cultural perceptions of the event: Immediate reactions of the Spanish colonial population

Creoles, colonial Spaniards, indigenous people, and other groups that formed the multicultural colonial society, interpreted the catastrophe in different ways. There is, however, a first immediate reaction consistent within all social groups interpreting the event as punishment inflicted by God or Andean deities. It has to be noted that during the first period of the event inhabitants of Arequipa and its neighbourhood did not know what had happened. From 19th February until the first days of April the citizens of the colonial town were submerged in almost complete darkness. Night and day could not be told apart and a constant shower of ash and volcanic material covered the whole region with a deadly layer, while terrible earthquakes destroyed many buildings including the cathedral killing those who had sought refuge in the church. Colonial Spanish citizens of Arequipa could not think otherwise but to believe that Apocalypse was imminent. Constant exhortations by priests to repent of one's sins and to see calamities of all sorts as divine punishments had paved the way for the adoption of the early modern retaliatory sin-economy.²⁰

Philippe Bouysse raised the question why the Spanish population of Arequipa did not take scientific theories into account to interpret the eruption of the Huaynaputina. Colonial authors like Jesuit father Bernabé Cobo (1582-1657) and Carmelite Antonio Vázquez de Espinosa (15?-1630) discussed contemporaneous theories of volcanic activity in their descriptions of the Huaynaputina catastrophe. Their theoretical framework was inspired by Aristotle, Pliny and other authors from Roman and Greek Antiquity. Cobo was especially concerned with the fact that during the Huaynaputina eruption neither Misti nor Ubinas had shown any volcanic activity. He concluded that

¹⁸ Keith A. Davies, "La tenencia de la tierra y la sociedad rural arequipeña en los siglos XVI y XVII." *Histórica* Vol. I, N° 2, 1977, pp.183-197, p.191.

¹⁹ David Noble Cook, *People of the Volcano: Andean counterpoint in the Colca Valley of Peru*. Durham and London: Duke University Press, 2007, p.238-241.

²⁰ For the concept see Behringer, *Kulturgeschichte*, p.169.

the three volcanoes must be connected with each other through subterranean galleries and therefore, according to Cobo's interpretation, the Ubinas had stopped to let out smoke, when the Huaynaputina exploded. Cobo was no eye-witness but had access to the Jesuit annual letters and other document collections of the Jesuit College in Cuzco which are most important sources with regard to the course of events as well as to the reactions of the population. Vázquez de Espinosa, in a similar vein, attributed earthquakes and volcanic eruptions to the subterranean circulation of gases.²¹

In fact scientific theories of seismic or volcanic catastrophes did not necessarily exclude early modern religious interpretations as divine punishment. Sometimes they could even harmonise.²² From the perspective of early modern sin-economy it makes sense to interpret a natural disaster, as for example a volcanic eruption, in the same way as epidemic disease or other calamities. In a religious world-view these events are signs which help to understand human life in universal history and the individual's place in the world.

With concern to the question, why at least during the first week colonial Spanish did not use any rational explanations of the eruption, Bouysse proposes the traumatic experience as an explanation for the total absence of theoretical or rational thought.²³ Certainly, in an early modern context there was plenty of evidence that Apocalypse was imminent: It was not possible to discern night and day, the clocks had stopped and the seismic activity contributed to a feeling of disorientation, the loss of spatial and temporal concepts, the air filled with ash and the smell of sulphur in combination with a shower of fireballs must have evoked associations with the Last Judgement, the coming of Antichrist, and the battle between the forces of good and evil at the end of days.²⁴ Additionally, the year 1600, the first of a new century, may have triggered millenarian and eschatological expectations.

Furthermore, Bouysse mentions another still more convincing reason for the Spanish colonial religious interpretation of the eruption referring to the importance of the concept of sin in early modern Spanish society. This interpretation was fostered by the particular date of the eruption in the first place which happened just after the Carnival season coinciding with Friday of the second week of Lent as the colonial author Cobo pointed out.²⁵ Secondly, in Christian thought God is also conceived as the Lord of heavens and thus of atmospheric phenomena. Heavy rainfall, thunderstorms, earthquakes and other calamities were consequently seen as divine punishments.²⁶ Prophets and religious or intellectual leaders often argued in their sermons explaining catastrophic events as divine punishment of the sinners. Also in early modern European thought calamities, such as epidemics, inundations, and so forth were alternatively interpreted as divine punishment, as resulting

²¹ Bouysse-Cassagne, Bouysse, *Lluvias*, p. 153-157.

²² See for example Dutch evidence in: Rienk Vermij, "Erschütterung und Bewältigung: Erdbebenkatastrophen in der Frühen Neuzeit." In: *Um Himmels Willen: Religion in Katastrophenzeiten*, Manfred Jakubowski-Tiessen/Hartmut Lehmann (eds.). Göttingen: Vandenhoeck & Ruprecht, 2003, pp.235-252, p.240.

²³ Bouysse-Cassagne, Bouysse, *Lluvias*, p. 158.

²⁴ Iris Gareis, "Wie Engel und Teufel in die Neue Welt kamen: Imaginationen von Gut und Böse im kolonialen Amerika." *Paideuma* 45, 1999, pp.257-273.

²⁵ Quoted in: Bouysse-Cassagne, Bouysse, *Lluvias*, p. 162.

²⁶ Bouysse-Cassagne, Bouysse, *Lluvias*, p. 159-162.

from certain astrological constellations or political situations.²⁷

The religious interpretation of the catastrophe among the Spanish colonial population was the logical consequence of early modern socialisation which was founded on a religious world-view. That means the interpretation of the Huaynaputina eruption as divine punishment was perfectly consistent with the symbolic system of early modern Spanish culture and did not exclude an additional scientific explanation of the event as the two ways of interpreting the world coexisted in early modern society.

4. Cultural interpretations: The indigenous perception

As has been mentioned above the explosion of the Huaynaputina destroyed several indigenous villages in the neighbourhood of the volcano taking a heavy death toll among their inhabitants. The very name “Huaynaputina” shows that the catastrophe of AD 1600 came unexpectedly for the indigenous population as well. Huaynaputina is a Quechua word which means “young volcano”. Before the explosion the mountain was called “Omate” or “Chilque Omate”, words which do not suggest volcanic activity.²⁸ In contrast, another name of the volcano in the immediate neighbourhood of the city of Arequipa, the Misti, was “putina” which means “volcano” clearly referring to its volcanic nature.²⁹

In a similar way as the colonial Spanish, the indigenous inhabitants of the area interpreted the catastrophe according to their religious and symbolic system. Some were convinced that the eruption of the Huaynaputina was a divine punishment, because they had abandoned the cult of the mountain gods after Christianization.³⁰ No longer had they sacrificed to the mountain deities or worshipped their gods. They believed that they would all perish and that the Huaynaputina eruption would end the world in a cataclysm. Native priests hurried to sacrifice animals and other offerings to the volcano. Even self-sacrifice to placate the god was reported by the Jesuits who were visiting the region shortly after the explosion. A Spanish chronicler interpreted the self-sacrifice as an act of despair, but it was consistent with indigenous beliefs. Human sacrifice had been part of Pre-Columbian religious cults in the Andes and was usually performed to placate the gods in periods of crises.³¹

The idea of cataclysms ending the world was deeply rooted in Andean Pre-Columbian thought. Andean cosmogonic myths refer to several earlier eras with different characteristics all of

²⁷ Iris Gareis, “La enfermedad de los dioses: las epidemias del siglo XVI en el virreinato del Perú.” *Bulletin de la Société suisse des Américanistes*, 61, 1997, pp.83-90, p.85.

²⁸ Bouysse-Cassagne, Bouysse, *Lluvias*, p. 144; Silva, Francis, *Volcanoes*, p.140.

²⁹ Felipe Guamán Poma de Ayala [c.1615], *El Primer Nueva Corónica y Buen Gobierno*, John V. Murra / Rolena Adorno (eds.). Traducción y análisis textual del quechua por Jorge L. Urioste (Colección América Nuestra, América Antigua 31), 3 vols. México: Siglo Veintiuno Editores, f.286. The Andean author Guaman Poma refers to an eruption of the volcano Putina (Misti) in Inca times which devastated the region of Arequipa.

³⁰ *Historia General de la Compañía de Jesús en la Provincia del Perú*. [1600]. Crónica anónima de 1600 que trata del establecimiento y misiones de la Compañía de Jesús en los países de habla española en la América meridional. F. Mateos (ed.), 2 vols. Madrid: C.S.I.C., 1944, vol. 2, Cap.XII, p.220.

³¹ Iris Gareis, *Religiöse Spezialisten des zentralen Andengebietes zur Zeit der Inka und während der spanischen Kolonialherrschaft*. (Münchner Beiträge zur Amerikanistik 19). Hohenschäftlarn: Klaus Renner Verlag, 1987, 335; *Historia*, vol. 2, Cap.XII, p.220.

which ended in cataclysms. Their inhabitants were either killed in the event or banished to other cosmic layers. According to more recent mythical texts, that happened for example to the population of the era preceding our own time. These people lived in a dark world only dimly lit by the moon as there still was no sun. When she rose to the sky, the people of the preceding age fled under the earth, some were burnt, others transformed to stone.³² In the Andes cataclysms are known as *pachacuti*, a word also used by a Pre-Columbian Inca ruler with the meaning “he who transforms the world”.³³ Such a *pachacuti*-cataclysm is not simply a destruction of the world, but an inversion of the present order, in the sense of the world turning upside down. Announced by the apparition of Tupac Amaru, the “royal serpent”, in colonial times the notion of *pachacuti* was linked by the Andean population to calamities of different sorts, such as landslides, earthquakes or volcanic eruptions, and the Spanish Conquest.³⁴

Calamities inflicted by Andean deities upon the autochthonous population as divine punishment were often associated with millenarian and eschatological ideas.³⁵ Such beliefs had been reported since the 1560s from the Andean region followed by several millenarian movements which arose in the late sixteenth century among the indigenous population. In 1589/1590 millenarian and messianic ideas spread among the Andean population as a consequence of an outbreak of epidemic disease. The south of the viceroyalty and the Arequipa region were particularly affected. Mortality rates were much higher among the indigenous population than among the Spanish colonial or Creoles. In general the millenarian ideas were linked to nativistic expectations, promising the followers that they will be liberated from the Spanish and Creole and be their own masters as before the Spanish conquest.³⁶

The Huaynaputina catastrophe led to different interpretations among the indigenous people. As it seems from the Jesuit reports, some thought that the eruption aimed at the white settlers in Arequipa and was intended to destroy the city and annihilate the inhabitants. But soon many of the indigenous people living near the volcano abandoned the area and fled to relatives or simply to places far away from the affected region. Others, convinced that the destruction of the world was imminent and that they would perish as well, slaughtered their sheep, chicken, and Guinea pigs, and arranged lavish banquets, drinking parties and dances. Traditionally these were religious ceremonies in which the chief offered food and alcoholic beverages to his followers. Generosity formed part of the so-called “Andean reciprocity”, a symbolic system which united the members of the social group with each other and human beings to the supernatural world. Therefore, sacrifices to the mountain gods and other deities were indispensable in order to satisfy the obligation of reciprocity.³⁷

³² Iris Gareis, *Llama und Alpaca in der Religion der rezenten Bewohner des zentralen und südlichen Andengebiets* (Münchener Beiträge zur Amerikanistik, 6). Hohenstaufen: Klaus Renner Verlag, 1982, 52-53, 74-77.

³³ Guamán Poma, *El Primer Nueva Corónica*, f.94.

³⁴ Iris Gareis, “República de indios — República de españoles. Reinterpretación actual de conceptos andinos coloniales.” *Jahrbuch für Geschichte von Staat, Wirtschaft und Gesellschaft Amerikas*, Vol. 30, 1993, pp.259-277, p.268; Guamán Poma [c.1615], *El Primer Nueva Corónica*, f.94.

³⁵ Guamán Poma, *El Primer Nueva Corónica*, f.94.

³⁶ Gareis, *Religiöse Spezialisten*, 335, 389-407.

³⁷ Gareis, *Religiöse Spezialisten*, 332-343; *Historia*, vol. 2, Cap.XII, p.220.

Some of the native priests consulted the oracle of the Huaynaputina. The mountain god told them that initially he had intended to destroy the Spanish city of Arequipa with the help of the Misti. But the volcano Misti answered that he could not assist the Huaynaputina, because he had been Christianized and received the name of San Francisco (St. Francis).³⁸ Misti is also a Quechua word with the meaning “foe”, a name used for the Spanish and other whites.³⁹

In a sense, the indigenous interpretation of the Huaynaputina eruption as divine punishment is similar to the Spanish colonial ideas. Although the Christian concept of sin did not match the indigenous notion of doing wrong, among Andean cultures there was general consent that violating religious or social commandments would result in divine punishment and eventually cause the annihilation of the social group or even the destruction of the world. Andean author Felipe Guamán Poma de Ayala developed in his chronicle from 1615 a particularly interesting interpretation of the Huaynaputina eruption as divine punishment: As the volcanic eruption killed many indigenous people in a sense it was also a divine punishment directed to the colonial Spanish population for their sinful life and maltreatment of the Andeans. Along with the epidemics ravaging among the indigenous population in the 1590s, the volcanic eruption decimated the indigenous people, thus diminishing Amerindian tribute payers and labourers.⁴⁰

As was the case with the Spanish colonial population, the indigenous people did not remain in despair. The indigenous reactions to the Huaynaputina catastrophe differ from one group to another. Some went away for the time of the eruptions others awaited their destiny in their village. The major part of the indigenous population did stay and later played an important role in the reconstruction of the city of Arequipa.

5. Conclusion: Questions and research problems

Many questions raised by the catastrophe could not be addressed in this paper, as for example changing perceptions of the spatial organization. Instead I should like to highlight some general research problems which may be of interest in a broader perspective. Cultures are not static they rather are subject to continuous processes of change. The catastrophic event in itself will probably lead to cultural change as the members of the respective groups will react to the catastrophe. They might take measures to prevent further damage, for example by using other materials in the construction of buildings and so on. Therefore, in order to study the consequences of a natural disaster it would be necessary to extend the research far beyond the time period in which the event actually took place. To the Huaynaputina explosion still no thorough and specialized analysis of archival sources has been dedicated. There are, of course, other useful studies especially on the Colca Valley by Noble David Cook and on certain subgroups of the colonial regional society. Hitherto Philippe Bouysse's work still offers the best and most complete anthropological and historical study of the catastrophic event. In the bulk of publications, however, the Huaynaputina catastrophe has only

³⁸ *Historia*, vol. 2, Cap.XII, p.220-221.

³⁹ Gareis, “República de indios”, p.273-274.

⁴⁰ Guamán Poma, *El Primer Nueva Corónica*, f.94-95.

been briefly touched in the context of other research topics or on the basis of published historical sources.

With regard to cultural interpretations of natural disasters and other calamities, it has furthermore to be noted that also early modern societies consisted of many different subgroups, and social strata, each of these parting of their own specific perspectives, shaping the visions of for example women differently from those of men. It is evident that even if a rich data basis is available, not all the groups will be documented in the historical sources in the same way. Some social groups, as for example members of the indigenous population, in the majority of cases will be represented by sources not produced by themselves. Due to the dissimilar situation with regard to the historical sources, the study of the cultural interpretations of the different subgroups will produce results of unequal validity.