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Ecocide in West Papua

THE CASE OF THE GRASBERG MINE

NABIL AHMED

Ecocide in West Papua

THE CASE OF THE GRASBERG MINE

ABSTRACT

Ecocide, the extensive loss, damage or destruction of ecosystem(s) of a given territory, is the missing international crime of our era. Gathering and examining evidence of ecocide requires a shift of perspective in understanding conflict as a territorial phenomenon. It also involves re-examining the material transformation of landscapes in ecological terms. This visual essay presents the investigative methods of INTERPRT¹, a transdisciplinary research and design project dedicated to examining environmental crimes. It collects and displays spatial evidence of widespread and long-term environmental damage from industrial mining. The larger project, within which this visual essay can be contextualized, addresses the future role of the International Criminal Court (ICC) in prosecuting ecocide and includes an exhibition proposed to take place at the Assembly of State Parties, the governing body of the court. This project claims that architectural and spatial readings have a critical role to play in the campaign to promote a law against ecocide in environmental justice contexts.

1 INTERPRT is an environmental justice project made up of a team of researchers and spatial designers.

Fig.1 Grasberg Mine, date unknown. Source Tapol archive.



In 1947, the United Nations (UN) General Assembly charged the newly established International Law Commission (ILC) to prepare a draft code of offences against the peace and security of mankind following “the principles of international law recognized in the charter of the Nuremberg Tribunal”.² In the following decades the ILC deliberated on “the code”, which would later become the Rome Statute, adopted in 1998 and entered into force in 2002—the treaty that established the International Criminal Court (ICC). Article 26 of the draft “code” recognized widespread destruction of the natural environment as a separate crime,³ but this Article was eventually removed as it was opposed by the United States, the UK and the Netherlands.⁴ In 2010, a leading advocate for earth law, Polly Higgins, submitted a draft law of ecocide to the ILC, in which ecocide became defined as “the extensive loss or damage or destruction of ecosystem(s) of a given territory, whether by human agency or by other causes, to such an extent that peaceful enjoyment by the inhabitants of that territory has been or will be severely diminished”.⁵

INTERPRT is currently exploring a number of situations of ecocide around the world. One of the projects focuses on the Pacific Ocean, which during the Cold War became a major nuclear testing site for the US, the UK and France. At present, many frontline Pacific island states experience the consequences of climate change and face existential threats due to anthropogenic sea level rise. What is more, along the geologic Pacific ‘Ring of Fire’ are located major conflicts around mining. One such site is in West Papua, the militarized Melanesian territory struggling for self-determination from Indonesia. Since 2014, INTERPRT has conducted spatial research in West Papua on ecocide by ecological destruction *inter alia* industrial mining and land grabbing. The project’s goal is to produce evidence to hold international corporations operating under state sanctioned industrial immunity accountable.⁶

In December 2017, INTERPRT was part of an informal coalition of organizations that intended to host a side event and associated exhibition on West Papua during the 16th Session of the Assembly of State Parties (ASP) of the ICC at the UN headquarters in New York.⁷ Following ASP protocol, official events may only take place if sponsored by a state party to the Rome Statute, which in this case was the Republic of Vanuatu.⁸ On December 8, the United Nations secretariat received a diplomatic correspondence from the permanent mission of Indonesia, requesting the cancellation of this intervention.⁹ Subsequently, both the side event and the exhibition could not take place as planned.¹⁰

The planned side event entitled “West Papua: forensic mapping and ecocide” and the related exhibition, entitled “Ecocide in West Papua,” was to feature the group’s forensic evidence. INTERPRT believes that the objections of the Indonesian state against these events are not only exemplary of a strategy of denial to engage with civil society and the international community on the question of West Papua. Bearing in mind that Indonesia is the third largest greenhouse gas emitter, we believe that this proceeding also proves the fact, that pushback against the recognition of ecocide persists until today.

With this visual essay on the Grasberg mine as a case of ecocide in the Pacific region, INTRPRT aims to show how a combination of various creative, interpretative, and evidence-based mapping techniques can not only contribute to the understanding of but also make claims for recognizing ecocide. The essay will show both the results of INTRPRT’s forensic mapping as well as reflect on some of the methodological challenges and innovations that are posed to advocate for justice.



UNFOLDED PACIFIC RING

West Papua is located on the New Guinea mobile belt on the Pacific 'Ring of Fire', a 40,000km long geological contingent line snaking around the edges of the Pacific Ocean. The line represents circum-Pacific zones of volcanic and seismic activity and overlaps vast mineral deposits of copper, gold, zinc, tin, mercury, uranium and other rare earth metals. It also represents a threshold condition between the littoral and the insular; surface and submarine depths; deep time and human history.

For a better visual and conceptual understanding of the pattern of ecological destruction in the Pacific, we created a contiguous line by unfolding the Ring of Fire outward from its northern axis. This line represents what we call an 'ecocide frontier' for conflicts between indigenous peoples, miners and local groups on the one hand, and extractive industries and states on the other. Transnational mining interests in West Papua are the driving forces of an underreported conflict between the Indonesian state and Papuans seeking to exercise their right to self-determination.

Continuous repressive measures have been imposed by the Indonesian state in occupied West Papua. These include a strict regime of limiting press freedom, the banning of political organization, a total access restriction for any international journalists and NGOs, and an abysmal record of human rights violations occurring on a daily basis.¹¹ In the face of this intense level of repression and near total impunity, Papuans not only have sought to bring attention to the human rights violations perpetrated against them; they have also organized to demand recognition of their collective rights. As our spatial analysis aims to show, their struggle for liberation is entangled with global capital and murky contaminations.

Fig.2 Unfolded Pacific Ring. Detail.
2016-ongoing. Credit: INTERPT.



na Mine

Nautilus Minerals
Deep Sea Mining

Nautilus Minerals
Deep Sea Mining

Ni, Co
Goro Mine

Nautilus Minerals
Deep Sea Mining

Au
Macraes Mine

THE GRASBERG MINE

The people of West Papua were systematically denied their right to self-determination during international diplomatic negotiations that took place in the 1960s between the Netherlands and its former colony Indonesia.¹² In 1969, under a controversial “Act of Free Choice”, the self-determination plebiscite brokered by the UN, Papuans unanimously voted to reject independence, choosing to remain as a province of Indonesia.¹³ In effect the international community failed to protect the political rights and freedoms of Papuans during decolonization. From the perspective of indigenous peoples this must be seen as a form of reterritorialization where the political process of decolonization is used to claim indigenous lands as part of newly formed ethnic nation states.

And yet global capital was already there. On April 7th, 1967, while the territory was still under dispute, Freeport Sulphur, a US-headquartered mining company, became the first foreign company to sign a ‘Contract of Work’ (CoW) with the Indonesian government regarding the exploration and development of a copper mining project in West Papua.¹⁴ The company had recently lost control of its nickel mining operations in Cuba when communists led by Fidel Castro seized power and nationalized industries.

Initially, the contract granted exploration, development and mining rights to Freeport within a 100 square kilometer area in the Papuan highlands (later extended to today’s Grasberg mine). The Amungme tribe who owned the land were neither consulted nor given any compensation in the contract’s inception but forced out. There were no environmental protection obligations. As the biggest taxpayer in president Suharto’s “new order” regime, Freeport therefore materially contributed to Indonesia’s war machine, which acted as a bulwark against the communist threat.

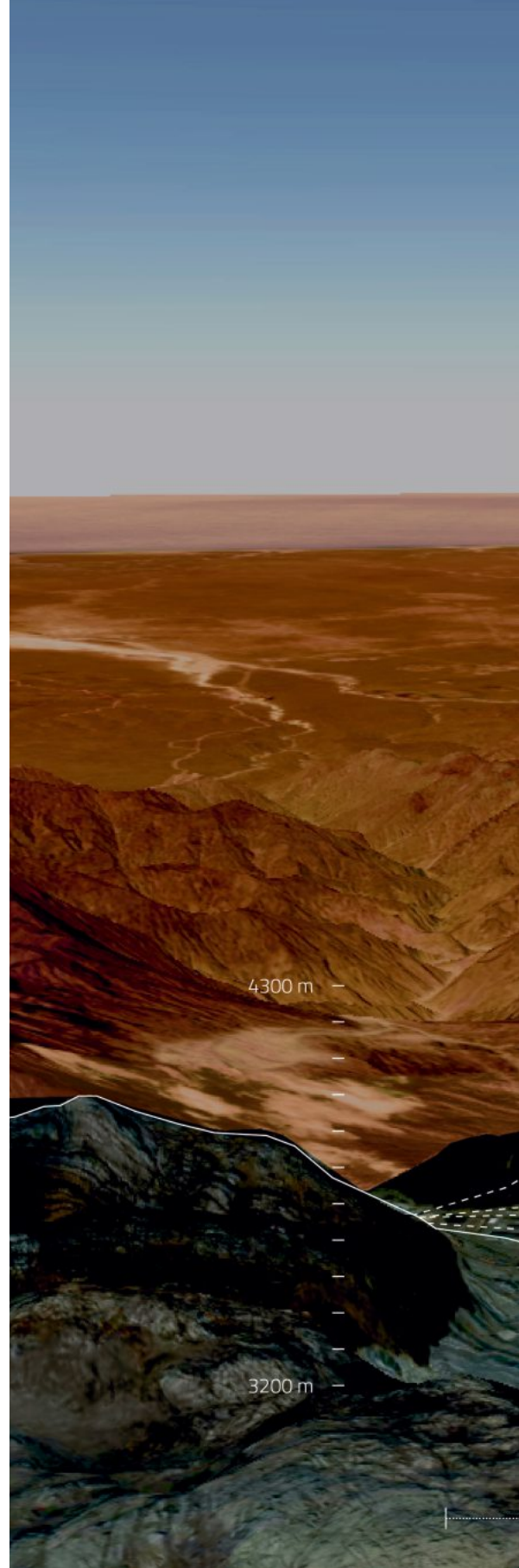
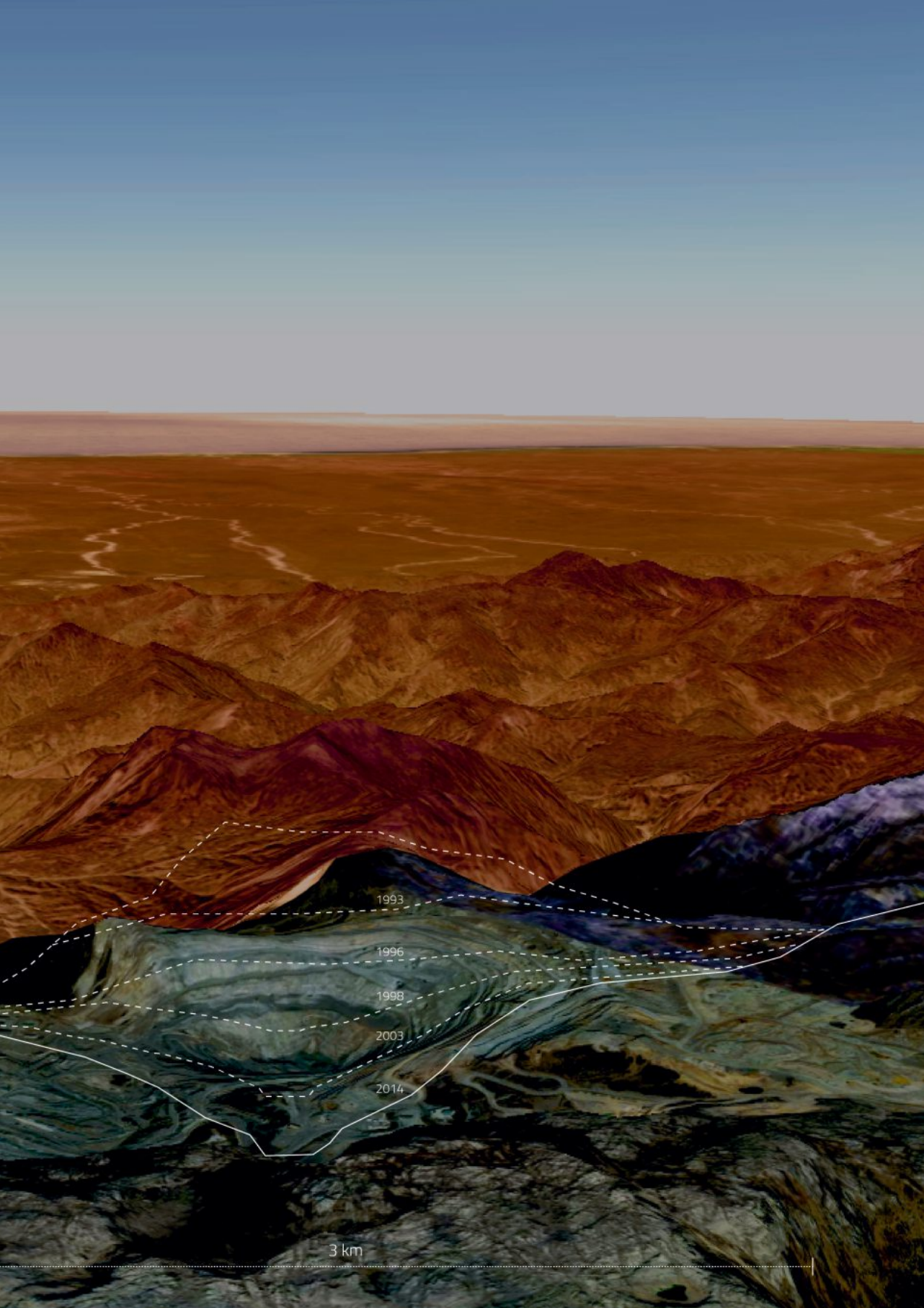
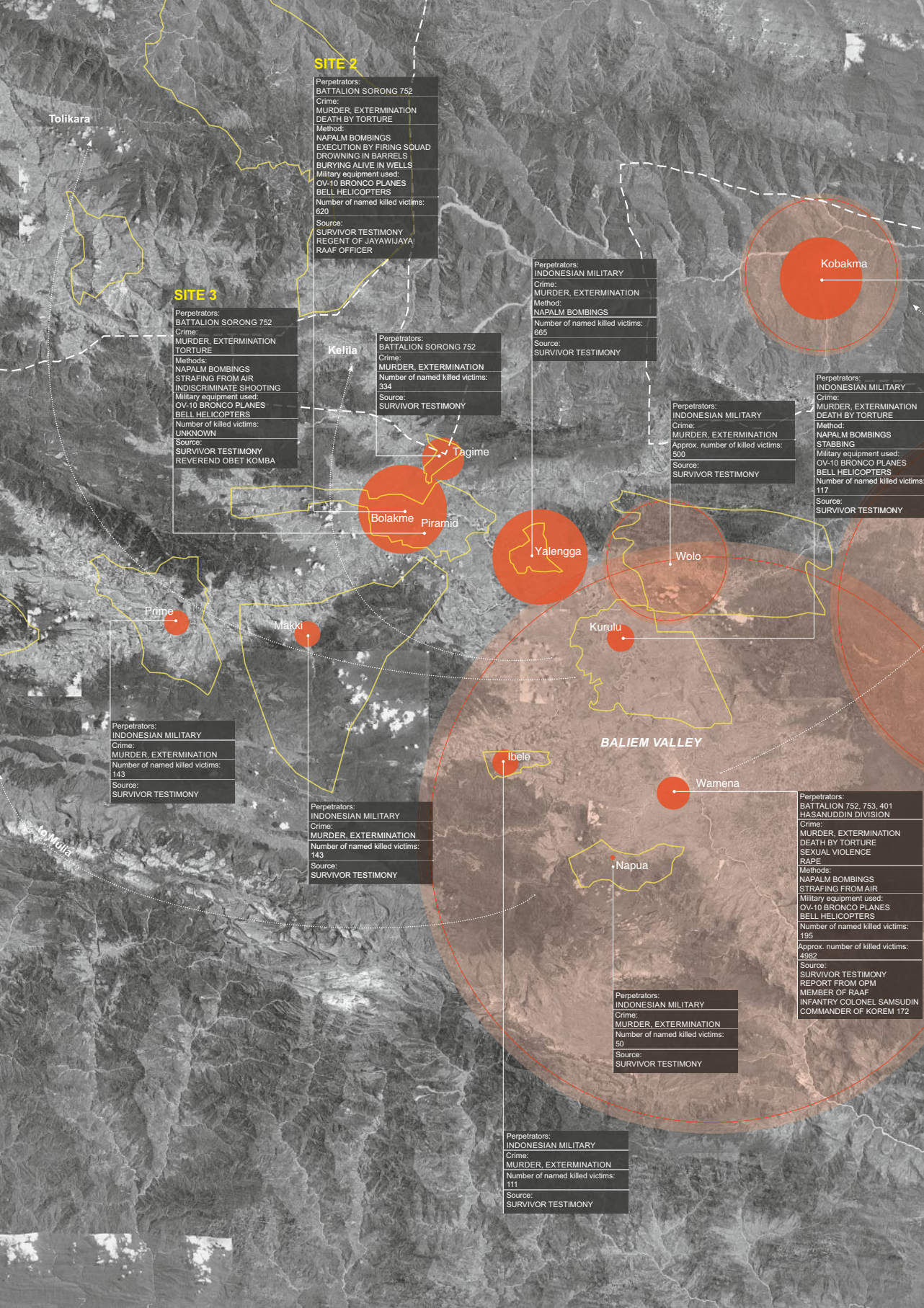


Fig. 3 Grasberg mine. Collage. 2015.
Credit: INTERPRT.



3 km



SITE 2

Perpetrators:
BATTALION SORONG 752
Crimes:
MURDER, EXTERMINATION
DEATH BY TORTURE
Method:
NAPALM BOMBINGS
EXECUTION BY FIRING SQUAD
DROWNING IN BARRELS
BURYING ALIVE IN WELLS
Military equipment used:
OV-10 BRONCO PLANES
BELL HELICOPTERS
Number of named killed victims:
620
Source:
SURVIVOR TESTIMONY
REGENT OF JAYAWIJAYA
RAAF OFFICER

SITE 3

Perpetrators:
BATTALION SORONG 752
Crimes:
MURDER, EXTERMINATION
TORTURE
Methods:
NAPALM BOMBINGS
STRAFING FROM AIR
INDISCRIMINATE SHOOTING
Military equipment used:
OV-10 BRONCO PLANES
BELL HELICOPTERS
Number of killed victims:
UNKNOWN
Source:
SURVIVOR TESTIMONY
REVEREND OBET KOMBA

Perpetrators:
BATTALION SORONG 752
Crimes:
MURDER, EXTERMINATION
Number of named killed victims:
334
Source:
SURVIVOR TESTIMONY

Perpetrators:
INDONESIAN MILITARY
Crimes:
MURDER, EXTERMINATION
Method:
NAPALM BOMBINGS
Number of named killed victims:
685
Source:
SURVIVOR TESTIMONY

Perpetrators:
INDONESIAN MILITARY
Crimes:
MURDER, EXTERMINATION
Approx. number of killed victims:
500
Source:
SURVIVOR TESTIMONY

Perpetrators:
INDONESIAN MILITARY
Crimes:
MURDER, EXTERMINATION
DEATH BY TORTURE
Method:
NAPALM BOMBINGS
STABBING
Military equipment used:
OV-10 BRONCO PLANES
BELL HELICOPTERS
Number of named killed victims:
117
Source:
SURVIVOR TESTIMONY

Perpetrators:
INDONESIAN MILITARY
Crimes:
MURDER, EXTERMINATION
Number of named killed victims:
143
Source:
SURVIVOR TESTIMONY

Perpetrators:
INDONESIAN MILITARY
Crimes:
MURDER, EXTERMINATION
Number of named killed victims:
143
Source:
SURVIVOR TESTIMONY

Perpetrators:
BATTALION 752, 753, 401
HASANUDDIN DIVISION
Crimes:
MURDER, EXTERMINATION
DEATH BY TORTURE
SEXUAL VIOLENCE
RAPE
Methods:
NAPALM BOMBINGS
STRAFING FROM AIR
Military equipment used:
OV-10 BRONCO PLANES
BELL HELICOPTERS
Number of named killed victims:
195
Approx. number of killed victims:
4982
Source:
SURVIVOR TESTIMONY
REPORT FROM OPM
MEMBER OF RAAF
INFANTRY COLONEL SAMUDIN
COMMANDER OF KOREM 172

Perpetrators:
INDONESIAN MILITARY
Crimes:
MURDER, EXTERMINATION
Number of named killed victims:
59
Source:
SURVIVOR TESTIMONY

Perpetrators:
INDONESIAN MILITARY
Crimes:
MURDER, EXTERMINATION
Number of named killed victims:
111
Source:
SURVIVOR TESTIMONY

Tolikara

Kelija

Tagime

Bolakme

Piramid

Yalengga

Wolo

Prime

Makki

Kurulu

Ibele

Wamena

BALIEM VALLEY

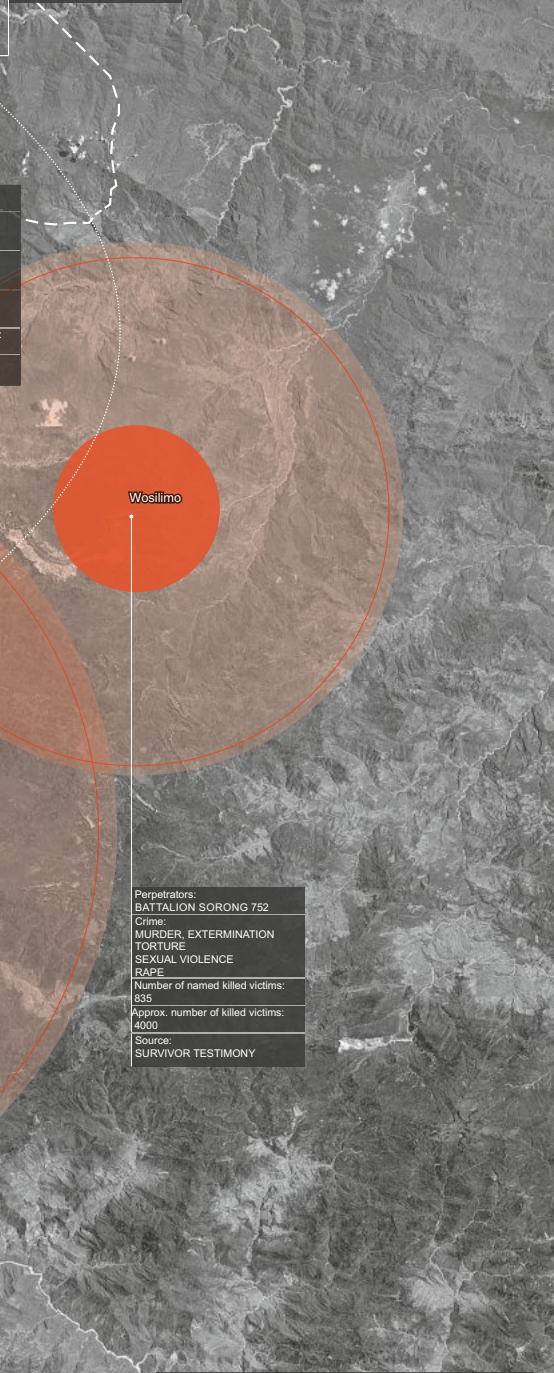
Napua

Wulla

Kobakma

SITE 1

Perpetrators of abuses:	BATTALION SORONG 752
Crimes:	MURDER, EXTERMINATION DESTRUCTION OF PROPERTY
Method:	INDISCRIMINATE SHOOTING BURNED HOUSES SHOT LIVESTOCK DESTROYED FARMS
Number of named killed victims:	579
Approx. number of killed victims:	1012
Source:	SURVIVOR TESTIMONY REPORT FROM OPM



Perpetrators:	BATTALION SORONG 752
Crime:	MURDER, EXTERMINATION TORTURE SEXUAL VIOLENCE RAPE
Number of named killed victims:	835
Approx. number of killed victims:	4000
Source:	SURVIVOR TESTIMONY

Source: The Neglected Genocide Human Rights Abuse against Papuans in the Central Highlands, 1978-1978. Asian Human Rights Commission and Human and Peace for Papua (ICP), 2013.

OPERASI KIKIS

Patterns of ecocide in West Papua arguably begin with the Indonesian state's genocidal violence under Suharto. Our visualizations are based on the Asian Human Rights Commission's (AHRC) 'The Neglected Genocide', a report detailing a series of human rights abuses that took place in the Central Highlands of West Papua as part of the Indonesian military's *Operasi Kikis* (which can be translated as "rub out") in 1977/78.¹⁵ Through conducting interviews with survivors and victims, the AHRC reported that at least 4,146 Papuan civilians including children, women, and the elderly were killed during the operation. These interviews moreover revealed that sexual violence against women, torture and ill treatment of Papuans by the Indonesian military were common at that time.¹⁶ The military were also reported to have burned the houses and destroyed the crops of Papuans who in some cases were forced to leave their villages and go into hiding in the mountain rainforest. Others fled to the neighboring country, Papua New Guinea, where many still remain as refugees.

Using the evidence provided by the AHRC report, this section of our incident map zooms in on the territory of the Dani peoples, one of the principal targets of the operation. The area, known as Baliem valley, was at the time a stronghold of the militant Papuan resistance movement, the OPM. The mapping visualizes the AHRC report's evidence - based on survivor testimonies - including massacre densities and lists the Indonesian military battalions involved, the atrocity crimes, and the number of civilian victims. We also identified three sites where we think there might still be mass graves. *Operasi Kikis* was one of at least four other major military operations carried out by the Indonesian forces under Suharto in Papua in the 1970s and 1980s. To this day, the Central Highlands remain an active operation zone for military, which extends along mining concession areas.

Fig. 4 Operasi Kikis. Detail. 2017.
Credit: INTERPR.T.

ENVIRONMENTAL CRIME SCENE

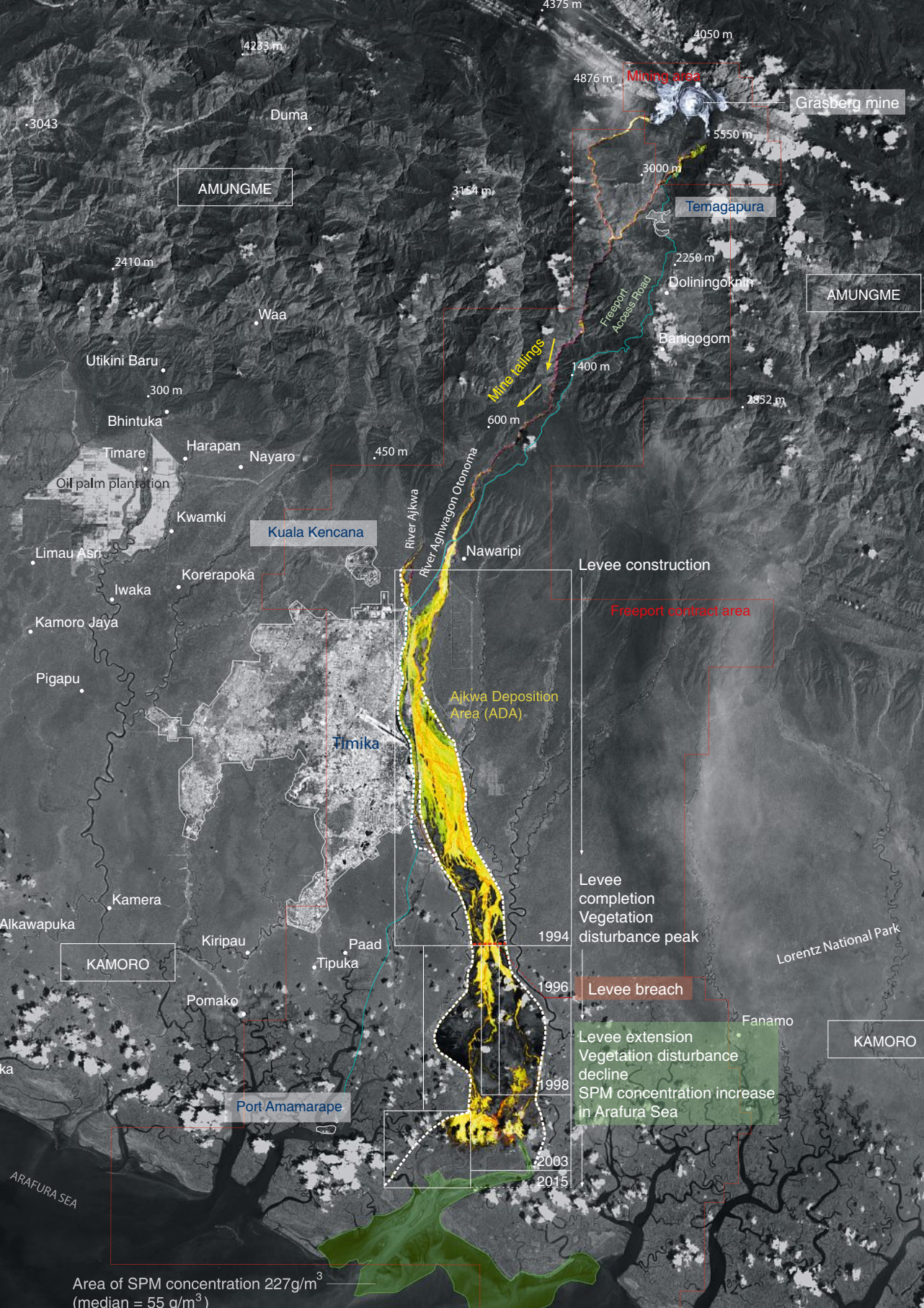
Environmental forensics is concerned with understanding landscape transformations and their diffused causality. At the outset, a topographic model helped us to visualize, in three dimensions, the Grasberg mine concession area as a crime scene of ecocide.

The open-pit Grasberg mine, in operation since 1987, is one of the world's largest copper and gold mines. The construction of mining infrastructure in a treacherous mountain terrain presented unique challenges. Bechtel, the contracted US engineering company, which once had built the Hoover Dam, began by cutting a 120km long access road tunneled through the Carstenz Range, traversing deep tropical forests down to the Arafura Sea.¹⁷ The mining towns Tembagapura, Timika and Kuala Kenkana thus became part and parcel of a plan to urbanize the forest and to facilitate Indonesia's "civilian occupation".¹⁸

The surface mining technique of an open-pit practiced by Freeport at the Grasberg mine is one of the most environmentally harmful mining practices as it produces large amounts of waste rock from excavation. Our site analysis shows that Freeport uses a 293,000ha area stretching from the Otomina and Ajkwa River to the Arafura Sea as a geotechnical system for depositing mine tailings. The concession area cuts through Amungme and Komoro peoples' territories.

Our investigation period (1987-2014) accounted for the time from the inception of the Grasberg mine until the start of the remote sensing study. We based our analysis solely on publicly available data, such as Landsat satellite imagery, corporate annual reports, NGO reports and environmental impact assessments. Of the 1.3 billion metric tons of copper ore excavated 1 to 1.5% was mineralized copper while 97% was discharged as mine tailings.¹⁹ The journey of the waste waters used in this process, defined by the topography, begins at the mine at an elevation of 4500m above sea level and progresses through its ore-processing center downstream to the lowland estuaries through diverse cloud, tropical and mangrove forests.²⁰

Fig. 5 Environmental crime scene.
2016. Credit: INTERPRT.



AMUNGME

Grasberg mine

Temagapura

AMUNGME

Kuala Kencana

Timika

KAMORO

Port Amarape

KAMORO

Levee construction

Freeport contract area

Aikwa Deposition Area (ADA)

Levee completion
Vegetation disturbance peak

Levee breach

Levee extension
Vegetation disturbance decline
SPM concentration increase in Arafura Sea

1994

1996

1998

2003

2015

Area of SPM concentration $227\text{g}/\text{m}^3$
(median = $55\text{g}/\text{m}^3$)

3043

4233 m

Duma

4876 m

4050 m

2410 m

Waa

3154 m

3000 m

5550 m

Utikini Baru

300 m

Bhintuka

Harapan

Nayaro

450 m

Kwamki

Korerapoka

Iwaka

Kamoro Jaya

Pigapu

Kamera

Alkawapuka

Kiripau

Paad

Tipuka

Pomako

Fanamo

ARAFURA SEA

Lorentz National Park

Freeport Access Road

River Aikwa
River Aghwagon Otonoma

Mine tailings

1400 m

600 m

2352 m

Nawaripi

Limau Asri

Kamoro Jaya

Alkawapuka

ka

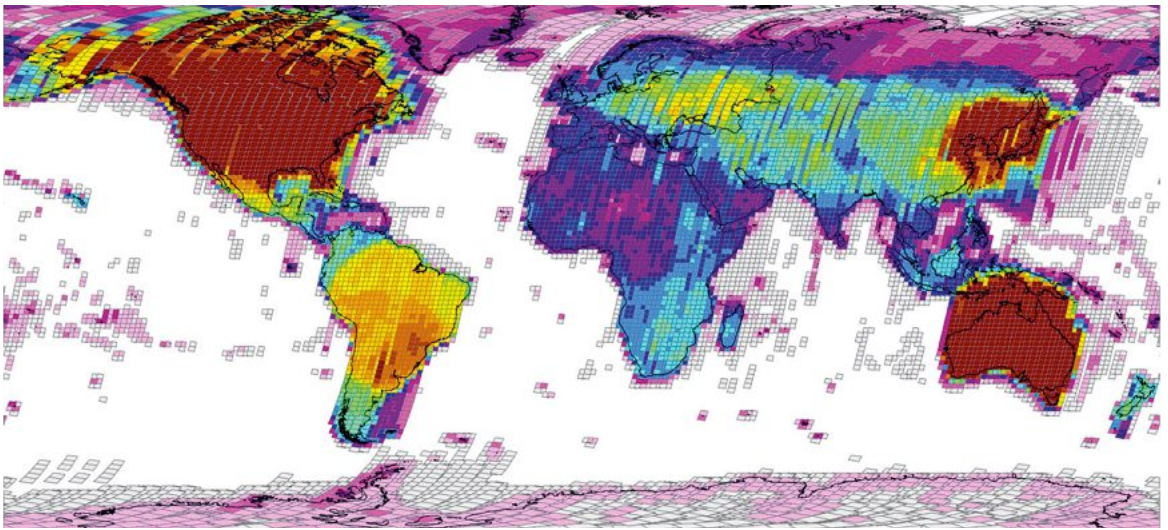


Fig. 1. USGS Landsat archive holdings as of January 1, 2015.

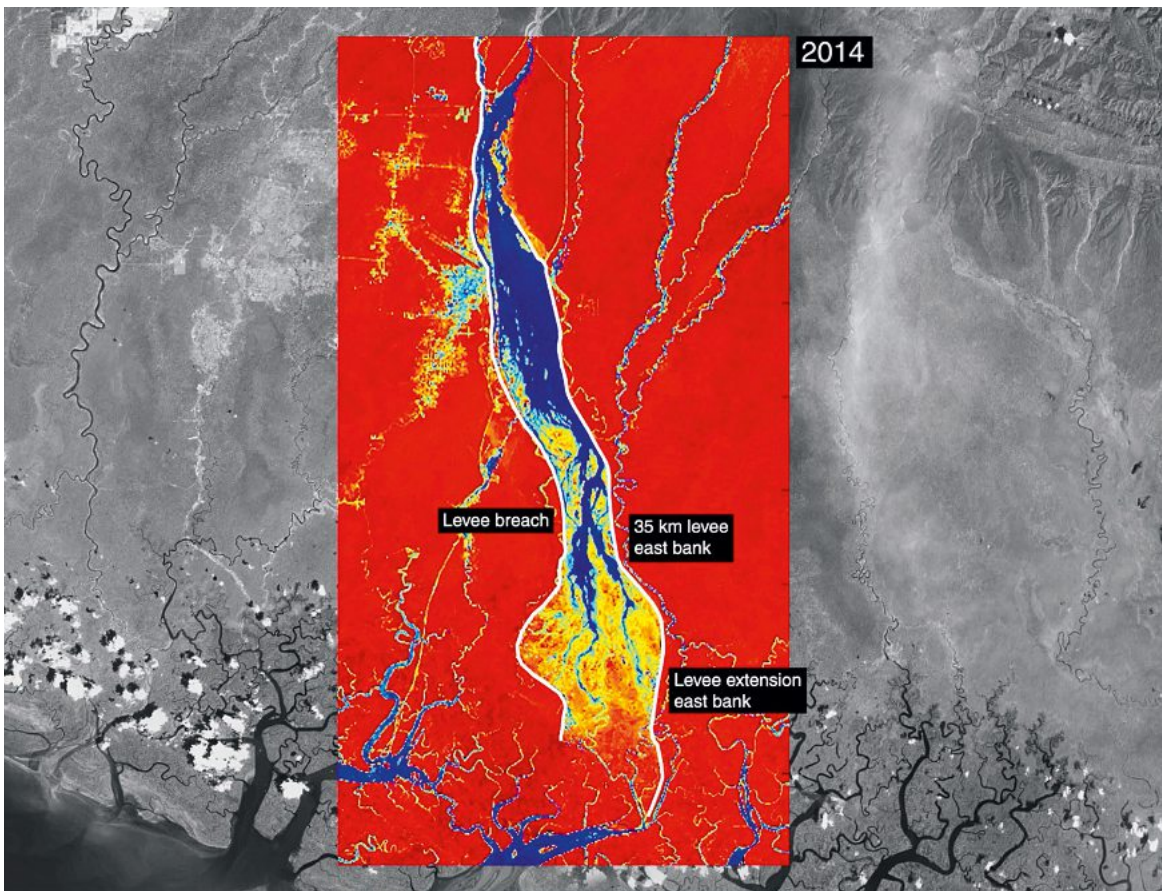
REMOTE SENSING AS TOOL

The reconstruction of environmental crimes, when perpetrated over a long period and at a territorial scale, can pose technical challenges. Such crimes complicate normative and legal standards of harm, intention and causality. As a tool for environmental forensics, remote sensing from satellite platforms not only allows for monitoring environmental change and reduces the need for physical site access. Also, remote sensing is a technique particularly well suited to collect information on both the geographic extent and the long-term impact of such changes under the threshold of harm in the definition of ecocide crime. Moreover, it allows civil society groups and NGOs access to scientific evidence previously unattainable. Lastly, when environmental crimes take place in distant, resource-rich areas of the world with records of human rights violations, the deployment of remote sensing reduces the risks to which witnesses and investigators are potentially exposed.

In our project, we used Landsat satellite imagery to picture mining operations and record their impact on the existing ecosystems. We took advantage of the fact that the Landsat family of satellites co-managed by USGS and NASA has collected the longest-running archive of earth observation imagery available, going back to 1972, when the first Landsat satellite was launched, and is freely available since 2008.²¹ Landsat 8, the current orbiting satellite, crosses every point on earth once every 16 days and collects data using a series of nine spectral bands. For our purposes, a data intensive time series analysis based on the Landsat archive of moderate resolution (30m or 30^z 30m size pixel) makes a more consistent observation of ecosystems and ecocide possible.

Fig. 6 Landsat World Mosaic. 2000.

Source: <http://www.esri.com/news/arcuser/0311/over-time-over-the-globe.html>

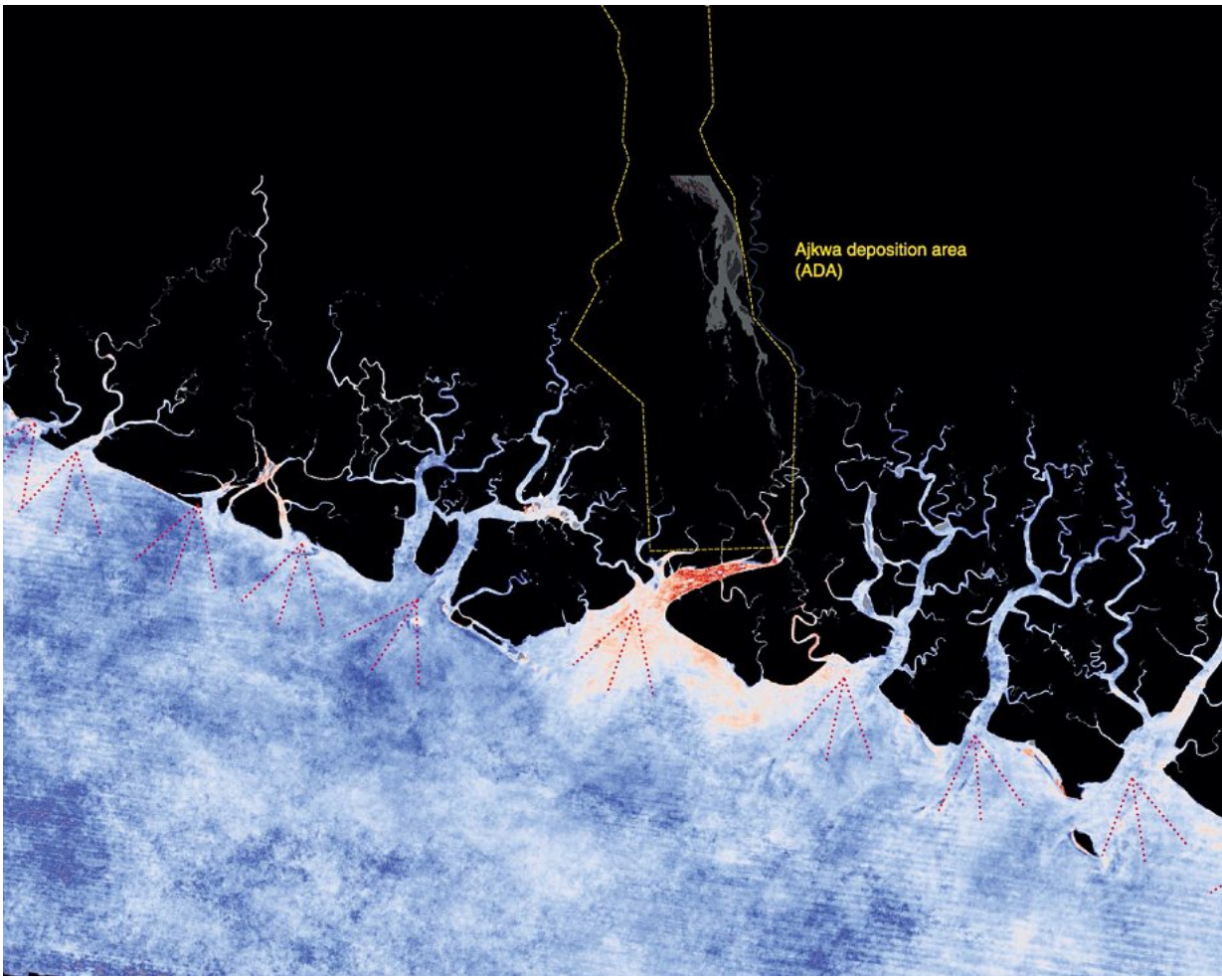


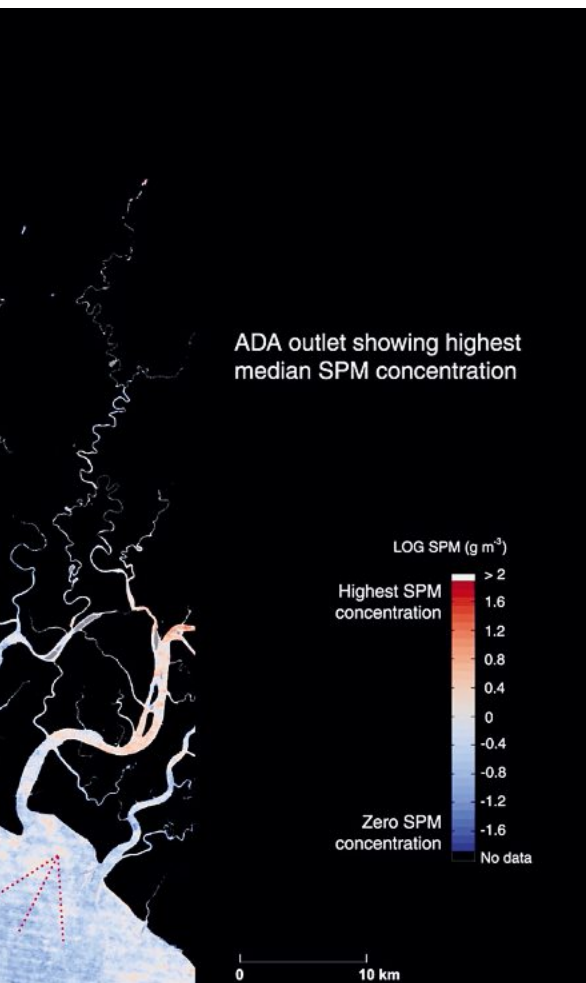
PEER THROUGH CLOUDS

Atmospheric contamination or noise such as persistent cloud cover, especially in temperate, tropical zones can obfuscate the imagery.²² For example, out of the 199 Landsat scenes in our time series, 120 had more than 50% cloud cover. Mike Alonzo, the remote sensing expert whom we collaborated with, developed a statistical algorithm resilient to atmospheric contamination, which made it possible for us to choose the best available cloud free pixels in the time series beginning in 1987.²³ This procedure allows detecting changes in the state of landcover (i.e. healthy vegetation -> disturbance -> vegetation decline -> partial regrowth) at pixel level. In other words, we followed the *pixel trajectory* of each cloud-free pixel within the ecocide crime scene allowing us to “peer through clouds”.

Using a Landsat satellite time series and NDVI (Normalized Difference Vegetation Index) analysis, we identified the gradual destruction of 138km² of rainforest, agricultural land and mangroves between 1987 and 2014, an area more than 42 times larger than the mine itself (study area 1). Between 1993 and 2014, Freeport constructed a system of levees along the eastern and western border of the Ajkwa river deposition area (ADA), which were supposedly designed to stop the overflowing of tailings into the rainforest. Our satellite imagery analysis shows that forest destruction continued through all its construction stages.

Fig.7 Ecocide in West Papua. Screengrab from video evidence (study area 1). Remote sensing analysis: Mike Alonzo. 2017. Credit: INTERPRT.





MURKY CONTAMINATIONS

We discovered that when plotted on a bar graph, the recorded vegetation disturbance per square kilometer nearly matched the daily rate of ore production as reported by the mining company up to 1996.²⁴ In subsequent years, the vegetation disturbance gradually declined while ore production levels remained relatively high. With increased discharge and continued heavy metal-rich tailing deposition, the riverbed in this period has dramatically aggraded and the channel capacity has been reduced.

Mine tailings that do not settle within the ADA are presumed to reach the Arafura Sea, where we hypothesize that they increase coastal suspended particulate matter (SPM) and heavy metal concentrations (study area 2). Based on this analysis, we conclude that compared to other riverine outlets, SPM concentrations in the Ajkwa river estuary have significantly increased after 1998, indicating a failure on the part of Freeport to contain tailings to the ADA. This represented a new phase in the conflict, since the health and livelihood of coastal communities as well as coastal species remain at stake.²⁵

From our mapping we learned that the transformation of Papuan landscape from mining is, in fact, a transformation at territorial scale that not only represents a long-term political conflict, but is materially a *conflict in motion* registered on the soil, subsoil, water and vegetation. Our systematic and spatially exhaustive remote sensing analysis captured this extraordinary land cover change in a series of pixel based image composites. What one sees is a reconstruction of space and time from a pixel level up to recognizable patterns. The final video evidence file combines this remote sensing analysis product with a series of research driven drawings and Google earth imagery.

Fig. 8 Ecocide in West Papua. Screenshot from video evidence (study area 2). Remote sensing analysis: Mike Alonzo. 2017. Credit: INTERPRT.









GROUND TRUTH

In remote sensing terms, 'ground truth' refers to the process of validating the information from satellite imagery analysis of particular pixels by comparing it with what can be found on the ground. Photographs taken by INTERPRT on a field trip in December 2016, near and within the study area of our remote sensing analysis, helped us to verify the extent of the environmental damage caused by the dumping of mine tailings into the Ajkwa river and the impact this had on the estuary over a prolonged period of time. We collected these photographs on site at personal risk²⁷, and put these here forward as evidence.

This validation exercise showed us that the scale of devastation within the ADA (study area 1) was staggering. We observed vast wastelands where once the Ajkwa river flowed, now a steady grey flow of river water mixed with mine tailings from upstream. Dead trees seem the only remainders of the rainforest. We experienced this as a near-apocalyptic scene that was completed with the continuous passing of Caterpillar load-haul-dump vehicles, carrying copper slurries 24-7 on the 100km Freeport access road running parallel to the ADA.

During a second expedition we traveled by speedboat to the river estuary (study area 2) to photograph locations where SPM concentrations were measured. As the boat neared the confluence of the river and the Arafura Sea, the color of the water turned visibly from blue to grey indicating high turbidity and silting.

With the mining concession area remaining militarized, access is restricted. Data collection on site without local knowledge would therefore not have been possible. With the help of Demi Bebari (LEMASA/Amungme Tribal Council) we further identified 15 military checkpoints along the Freeport access road that runs from the mining complex to the company port facility in Amamapare, from where the gold and copper slurry are shipped to reach global markets. This demonstrates to us the role of Indonesian armed forces in the protection of mining interests, which, so we believe, further attests to the entanglement of state violence and corporate power in West Papua.

Fig. 9 and 10 (two previous double-pages)
Ground truth photographs series (study areas 1 and 2). 2016. Credit: INTERPRT.



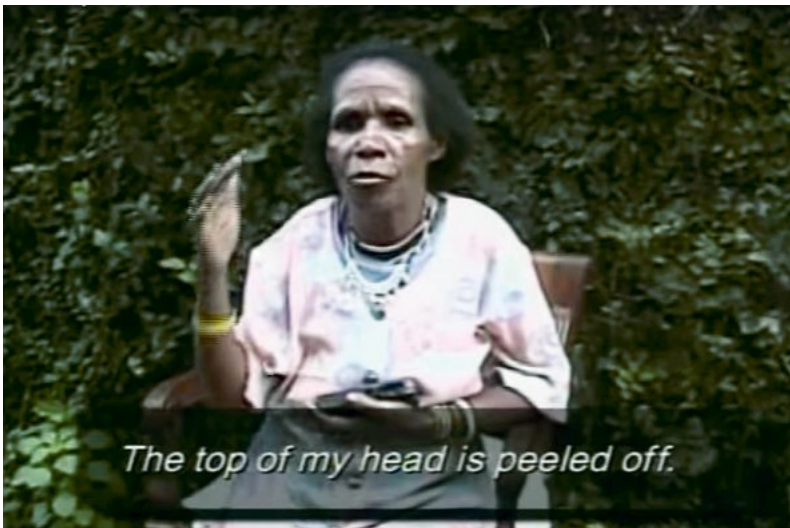
SOLIDARITY IN TROMSØ

In Amungme cosmology, spirits inhabit their landscapes. One of the most respected of the spirits is Tu Ni Me Ni, representing fertility and embodied in the landscape with “her head in the mountains, her breasts and wombs in the valley and her legs stretched out toward the distant coast”.²⁶ According to Mama Yosepha Alomang, an Amungme community leader who has campaigned against Freeport most of her adult life, and for which she was awarded the prestigious Goldman Prize in 2010, Freeport has severed the head of her people’s mountain spirit.²⁸

Already in the 1990s, Amungme leaders and elders, namely Tom Beanal and Mama Yosepha, had made unsuccessful attempts to bring civil litigation lawsuits against Freeport McMoRan Inc. before US federal district courts, for cultural genocide of Amungme tribe, human rights violations and international environmental torts.²⁹ While there remains strong interest amongst civil society initiatives for legal redress, progress has been difficult due to a lack of perceived jurisdiction.

INTERPRT’s goal is in that sense not limited to gathering and examining spatial evidence but also to assist local communities wishing to hold Freeport and the Indonesian state accountable. After our advocacy efforts at the Assembly of State Parties of the ICC, we recently conceived a workshop and invited Mama Yosepha as keynote speaker. Organized by the Office for Contemporary Art in Norway (OCA) and the Arctic University of Norway in Tromsø, the workshop also facilitated the first eco-indigenous solidarity between Amungme and Sámi politicians and lawyers.³⁰

Fig. 11 Workshop „Fighting Environmental Crime in West Papua“. 2018. Credit: UiT - Arctic University of Norway, Credit: OCA and INTERPRT.



NEMANGKAWI

The meeting in Tromsø produced an open exchange of stories and ideas in exploring how indigenous knowledge might work together with spatial evidence in current and future legal contexts. We discussed legal strategies and also the importance of community organization. Mama Yosepha Alomang's powerful testimonies of speaking truth to power - she is a survivor of the military violence from the 1970s - brought into sharp relief the brutality of Indonesia's civilian occupation of West Papua. For decades she led her community and fought for their rights, for which she has been tortured and imprisoned. Mama Yosepha informed us that it was her who once gave birth to *Nemangkawi*, the mountain where the Grasberg mine is located. And so we learned of the mountain's real name.

Crucially, the forum allowed for the presentation of INTERPRT's spatial evidence to Papuan leaders from communities most impacted by the Grasberg mine for the first time. This gives us confidence that sophisticated environmental forensic mapping techniques, as we have discussed here, can help explain the larger narrative of ecocide. In the case of the Grasberg mine we show the potential of how such digital evidence, when triangulated with testimonial and documentary evidence, can inform and advance future prosecutions of environmental crimes.

Fig. 12 Mama Yosepha Alomang. (Filmstills) 2018. Credit: UiT - Arctic University of Norway, Credit: OCA and INTERPRT.

NABIL AHMED

Nabil Ahmed is a transdisciplinary scholar and writer. He leads INTERPRT, a long term project that investigates contemporary environmental crimes with a focus on the Pacific region. INTERPRT's work has been exhibited at Arts Catalyst, 2018 Dhaka Art Summit, The Museum of Modern Art in Warsaw and with Forensic Architecture. His writings have appeared in Scientific Reports, Archaeological and Environmental Forensic Science, Documenta 14 Journal, Third Text, Scientific Reports, Sternberg Press, MIT Press, Volume, Mousse Publishing and Routledge. He holds a PhD from the Centre for Research Architecture where he is affiliated with Forensic Architecture. He is a senior lecturer of architecture (history and theory) at The Cass School of Architecture at London Metropolitan University.

FOOTNOTES

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- 8 Letter from Hon. Charlot Salwai, Prime Minister of Vanuatu to the Secretariat of the Assembly of State Parties, October 30th, 2017. An electronic copy of the letter was circulated to member organizations of the informal coalition (see note 7).
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27 As an example we passed the Freeport access road checkpoint nearest to the section of the ADA we planned to visit without attracting any undesired attention thanks to the sharp wit of Demi Bebari, our interlocutor. There are considerable risks involved in conducting research in West Papua. Foreign nationals have been detained, expelled, blacklisted or denied entry by Indonesian authorities simply for arousing suspicion. See the recent deportation of the Australian student Belinda Lopez: <https://www.theguardian.com/world/2018/aug/04/australian-student-barred-from-indonesia-and-blacklisted-by-government> (last accessed November 25th, 2018) and the arrest of Polish citizen Jakub Skrzypski: <https://www.radionz.co.nz/international/pacific-news/365290/polish-man-detained-in-papua-after-claims-of-separatist-links>, (last accessed November 25th, 2018)

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30 The workshop was organized in the context of the OCA Norway's exhibition "Let the River Flow: The Sovereign Will and the Making of a new Worldliness". The exhibition showcases the role of Sámi artists in the Áltá-Guovdageaidnu Action (c. 1978–82), a series of protests against the construction of a hydroelectric power plant on the Áltá river in Finnmark, Norway that transformed indigenous Sámi and Nordic state relations. It also presents contemporary artistic positions, Sámi and international, exploring the legacy of this eco-Indigenous uprising today. Other key collaborators in the workshop were Andrew Hickman from London Mining Network, Veronica Koman, Indonesian human rights lawyer, Fadjar Schouten-Korwa from the International Lawyers for West Papua (ILWP), and Markus Haluk, secretary of the United Liberation Movement for West Papua (ULMWP)

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West Papua project team: Nabil Ahmed (principal investigator) and Olga Lucko (spatial designer). Mike Alonzo (American University) and Jamon van den Hoek (Oregon State University) provided key remote sensing analysis.
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