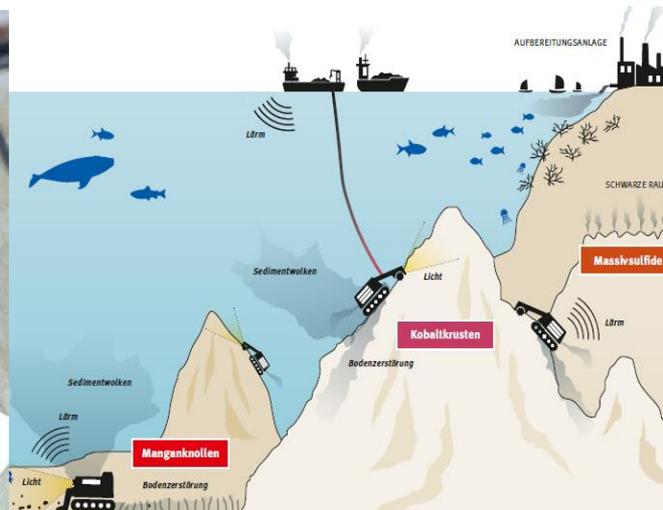


Plundering Nature?

Deep Sea Mining – An Incalculable Risk

January 2016



Dr Roland Seib, Darmstadt

- **Regulatory framework: International Seabed Authority (ISA)**
- **Background: marine natural resources and mining**
- **German interests and commitment**
- **European interests in deep sea mining**
- **Maritime mineral deposits**
- **Nautilus Minerals in the South Pacific**
- **Merely pollution or the end of the oceans?**
- **Implications for development policy**
- **The justified call for a moratorium**

- **The United Nations Convention on the Law of the Sea (UNCLOS)** defines the rights and responsibilities of nations with respect to their use of the world's oceans. The international agreement, passed in 1982, is the result of the third UN Conference on the Law of the Sea and was ratified in 1994.
- UNCLOS defines the High Sea as common heritage of mankind and common resource to all states. It differentiates four zones: Territorial Waters (12 nautical miles), Exclusive Economic Zones (200 nautical miles), Continental Shelf (350 nautical miles) and the High Sea.
- 166 states and the European Union have ratified the Convention.
- UNCLOS specified the 1994 foundation of the **International Seabed Authority (ISA)** based in Kingston, Jamaica.
- Since 2001, ISA has granted 15 year licenses to explore areas of the seabed for resources. These can only be applied for with the support of states.
- So far, **23 exploration licenses** were issued, amounting to 1.2 million km² of seabed (ISA website, January 2016).
- 2016/17 ISA intends to submit a set of rules on environmentally friendly mining of manganese nodules. ISA insists on the **precautionary principle** of risk and hazard prevention
- Further important international bodies for UNCLOS are the **International Tribunal for the Law of the Sea** in Hamburg and the **Commission on the Limits of the Continental Shelf** based in New York.

Three kinds of marine mineral resources: massive sulphides



Photo: Black Smokers can be up to 15 meters high, source: UNEP, May 2014



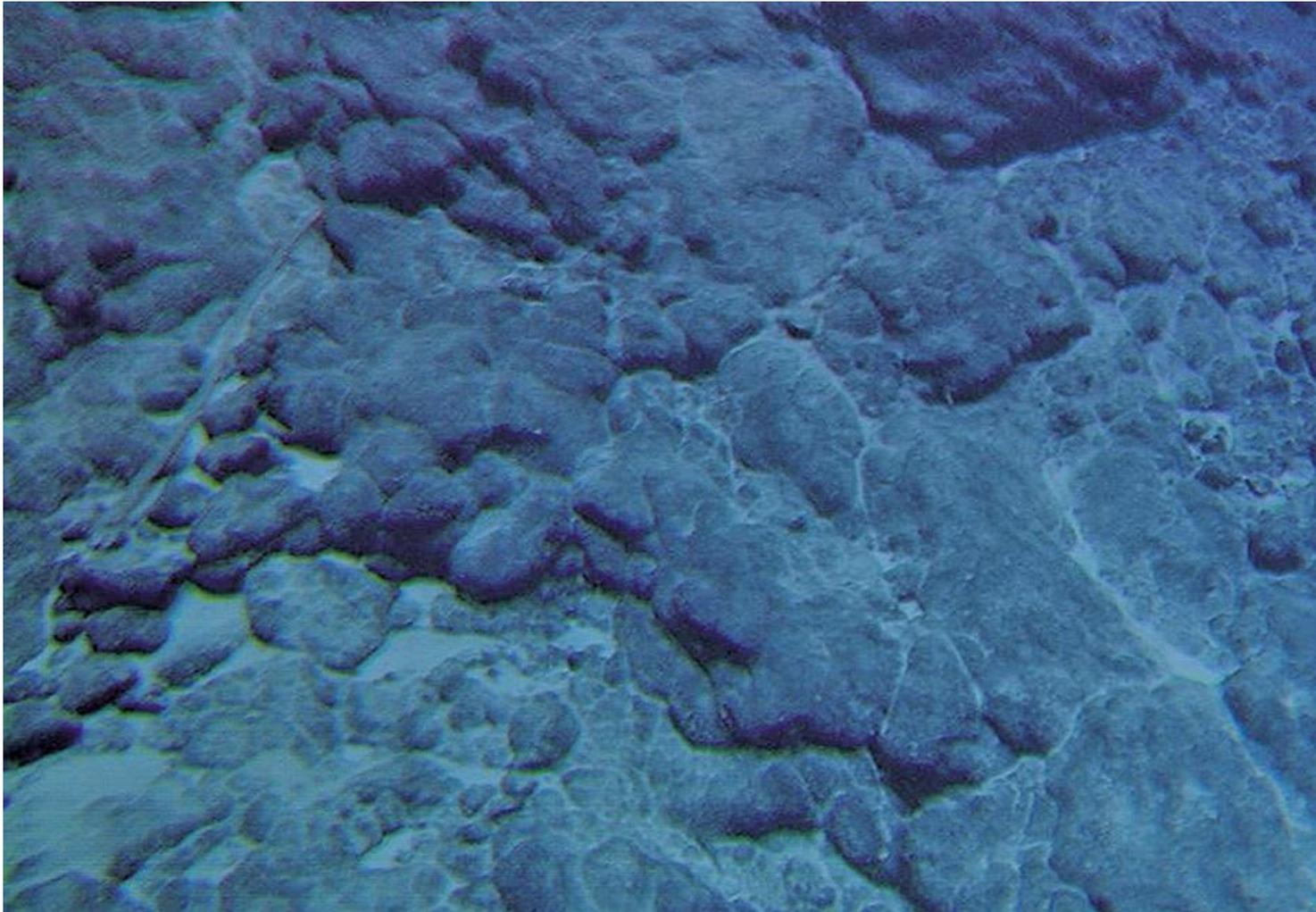
Photo: Nautilus, Source: The Guardian, 01.01.2013

Massive sulphides are at depths between 1,000 and 4,000 meters. They consist of copper, zinc, lead, gold and silver, as well as trace metals such as indium, germanium, tellurium and selenium.

Manganese nodules



Manganese nodules on the ocean floor in the Clarion-Clipperton Zone. The image was taken with ROV KIEL 6000 during expedition SO239 with RV SONNE in April 2015 (Photo: ROV team; GEOMAR Helmholtz Centre for Ocean Research Kiel). Manganese nodules are found at depths of 3500-6500 meters. They include mainly the chemical elements manganese, iron, copper, nickel and cobalt as well as substances such as molybdenum, zinc, lithium, vanadium and traces of rare earths.



Cobalt crusts located on the seabed at depths between 1,000 to 3,000 meters (Photo: Japan Agency for Marine-Earth Science and Technology / JAMSTEC). They contain mainly manganese, iron, cobalt, nickel and platinum and rare earth elements.

Drivers and restricting forces of deep sea mining

	Global	Industry	Pacific Island Countries
Primary drivers	<p>Global economic growth: supply and demand, population and consumption, increased industrialisation and urbanisation</p> <p>Technological advances in materials handling technology of offshore industry (oil, gas, cable)</p> <p>State actors: Securing access to essential resources for companies</p>	<p>Innovative, frontier field in an industry used to high-risk investment</p> <p>Increasing difficulty and complexity of terrestrial mining: Increasing costs, decreasing grade, political availability („fragile“ or „failed states“), Oligopolistic structures in producer</p>	<p>Alternate development option: alleviate poverty, meet rising aspirations, lack of comparative advantage in other areas</p> <p>Marine minerals are a new natural resource capable of commercial exploitation in a region with few economic industries/choices</p>
Secondary drivers	<p>Growing societal aspirations for environmental and social sustainability</p>	<p>Technological improvements</p>	<p>National independence and autonomy</p>
Restricting forces	<p>Price volatility</p> <p>Concerns over threats to marine environment, lack of marine science to inform conservation planning</p>	<p>Availability of funds, financial uncertainty</p> <p>Regulatory uncertainty in EEZ and the Area, Significant obligations to share knowledge proceeds with ISA</p>	<p>Growing community concerns about governance and impact of, as well as returns from extractive industries</p> <p>Lack of governance, capacity and regulation</p>

German interests and commitment in deep sea mining

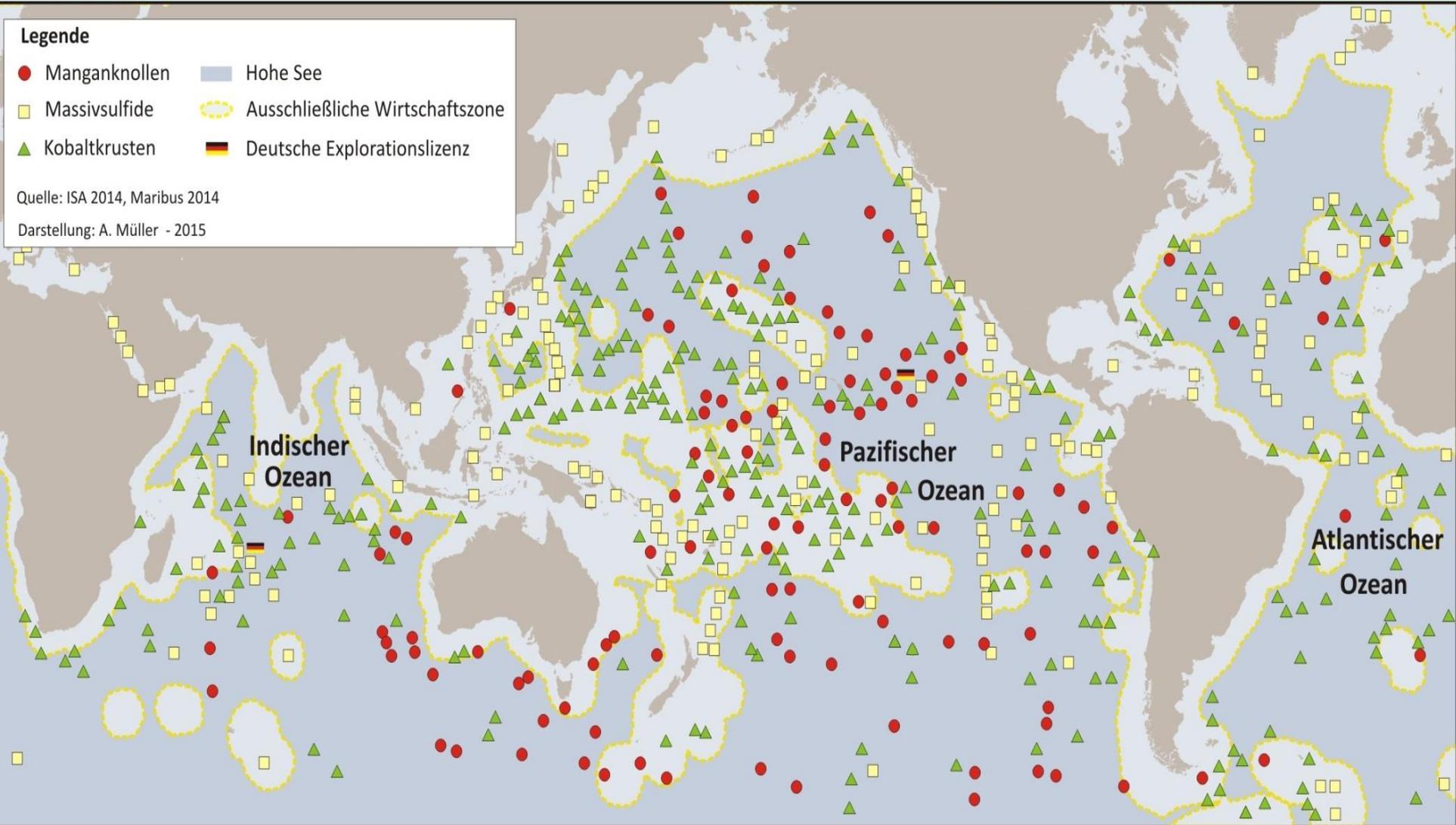
- **In cooperation with the Institute for Geosciences and Natural Resources (BGR) Germany has two exploration licenses in international waters:** for manganese nodules (since 2006 in the Clarion-Clipperton Zone of the central Pacific) and for polymetallic sulphides (since 2014 in the Indian Ocean near Madagascar).
- **Main aims of German politics:**
 - Promotion and integration of research and maritime industry
 - Securing technological leadership and international competitiveness
 - Long-term security of supply for companies with high-tech resources
- **Since 2000, deep sea mining has been on the political agenda**
 - **Creation of a *Coordinator for the maritime industry*** working in the Federal Ministry for Economic Affairs and Energy (BMWi)
 - **2002 Bundestag decision** to develop the world market for maritime technology
 - **2011 Masterplan Maritime Technologies**
 - **2012 Founding of the *German Mineral Resources Agency*** as a sub department in the BGR by the federal government
 - **2014 Establishing *DeepSea Mining Alliance*** as a unified advocacy for the industry in relation to politics, economy and society
 - **Oct. 2015: France and Germany agree on closer cooperation**
- **The federal government shows restraint in initial investments. German companies and research institutes are increasingly relying on the European Commission.**



Diving robot ROV Kiel 6000, used by German researchers of the GEOMAR Helmholtz Centre for Ocean Research Kiel to search for deep sea mineral deposits. (Source: Die Welt, 14 May 2014)

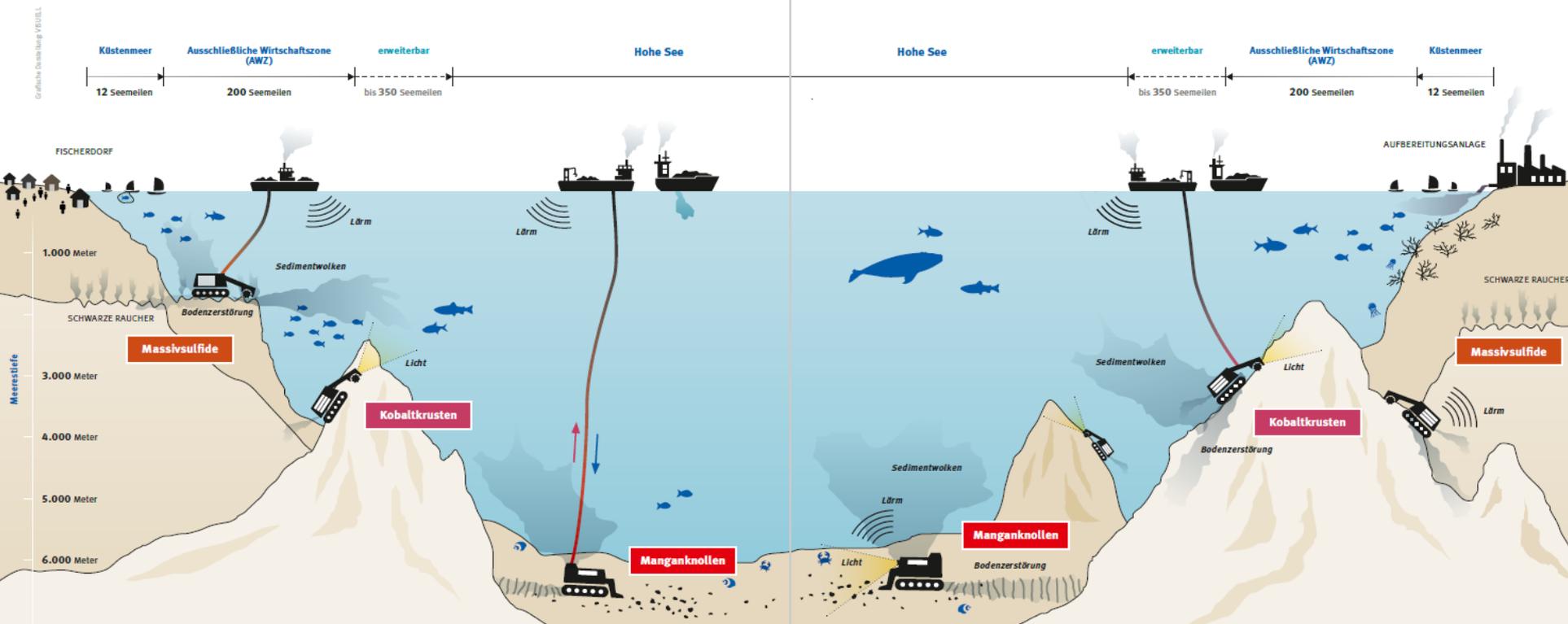
- **EU countries with exploration licenses in international waters:** France, Belgium, the UK, a consortium led by Poland, the Czech Republic, Slovakia and Bulgaria (with Russia and Cuba).
- **The EU initiated and supported a number of research projects:**
 - **Blue Atlantis - Innovative Mining of Marine Mineral Resources:** Adjacent to the Azores a test facility for seabed mining is planned (45 companies and research institutes from 8 EU countries)
 - **Research project MIDAS** (Managing Impacts of Deep Sea Resource Exploitation)
 - **Blue Mining - Breakthrough Solutions for Mineral Extraction and Processing in Extreme Environments**
 - **JPI Oceans Ecological aspects of deep sea mining:** The project aims to examine the risks of seabed mining. The focus is on manganese nodules.
 - Since 2011 the EU supports the Pacific archipelagic nations (+ East Timor) in the **Deep Sea Minerals Project** (DSMP), aimed at drafting a legal framework for seabed mining.

Significant deposits of marine mineral resources

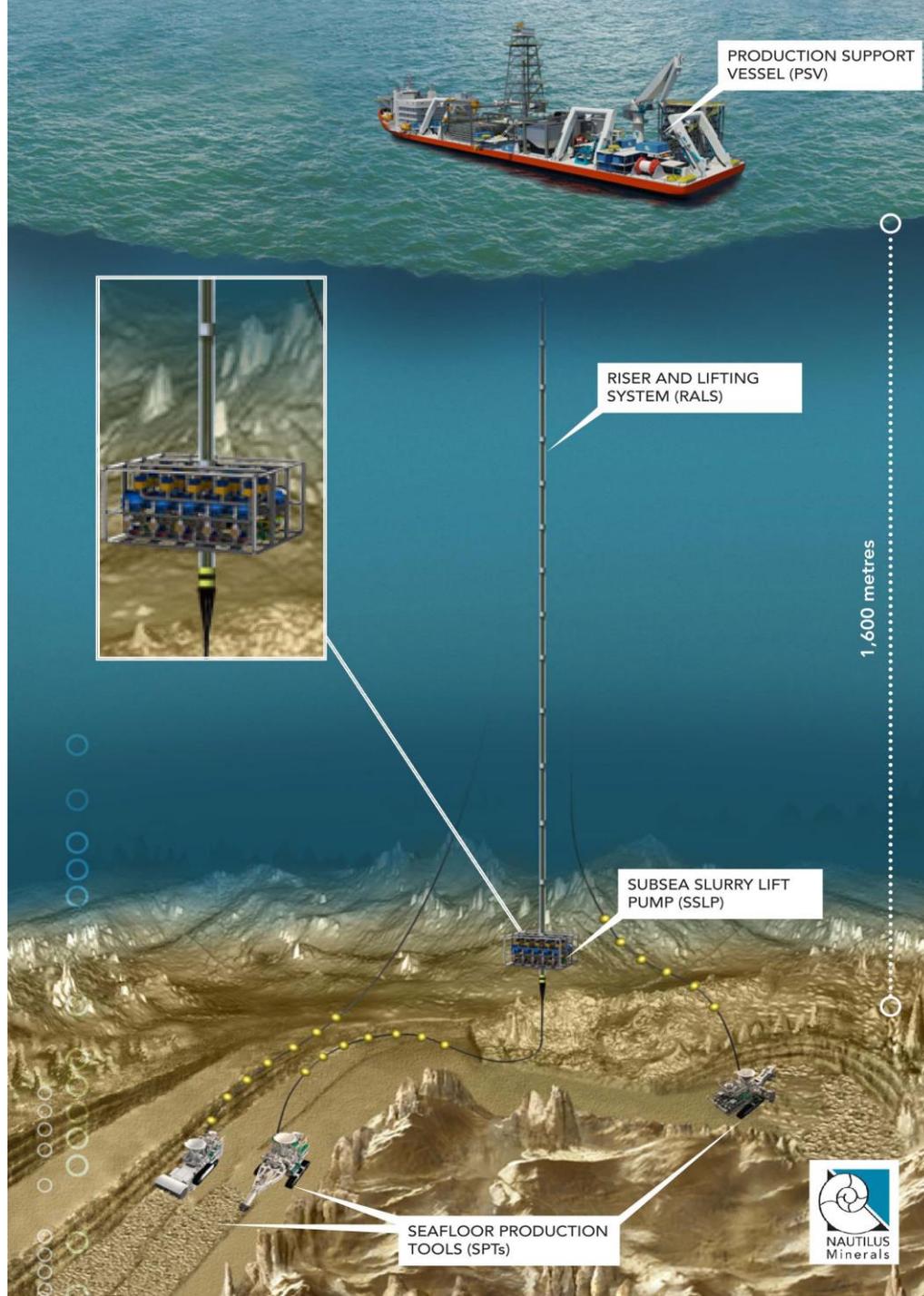


Source: Misereor (2015): Tiefseebergbau. Unkalkulierbares Risiko für Mensch und Natur. Im Fokus – der Pazifik

Abb. 3: Schematische Darstellung des Tiefseebergbaus



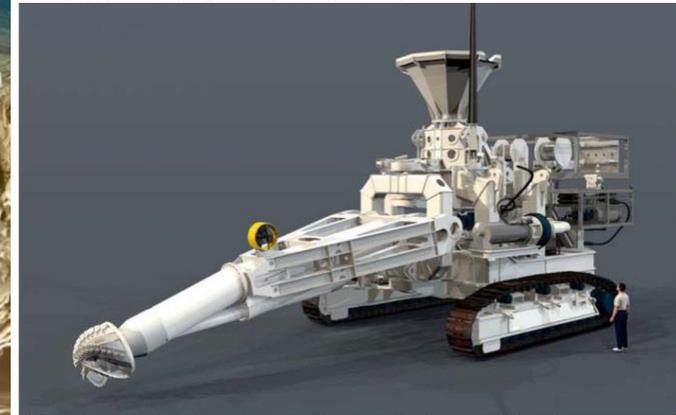
Source: Misereor (2015): Tiefseebergbau. Unkalkulierbares Risiko für Mensch und Natur. Im Fokus – der Pazifik



Auxiliary Cutter (AC) - cuts material on uneven surfaces, benching the site

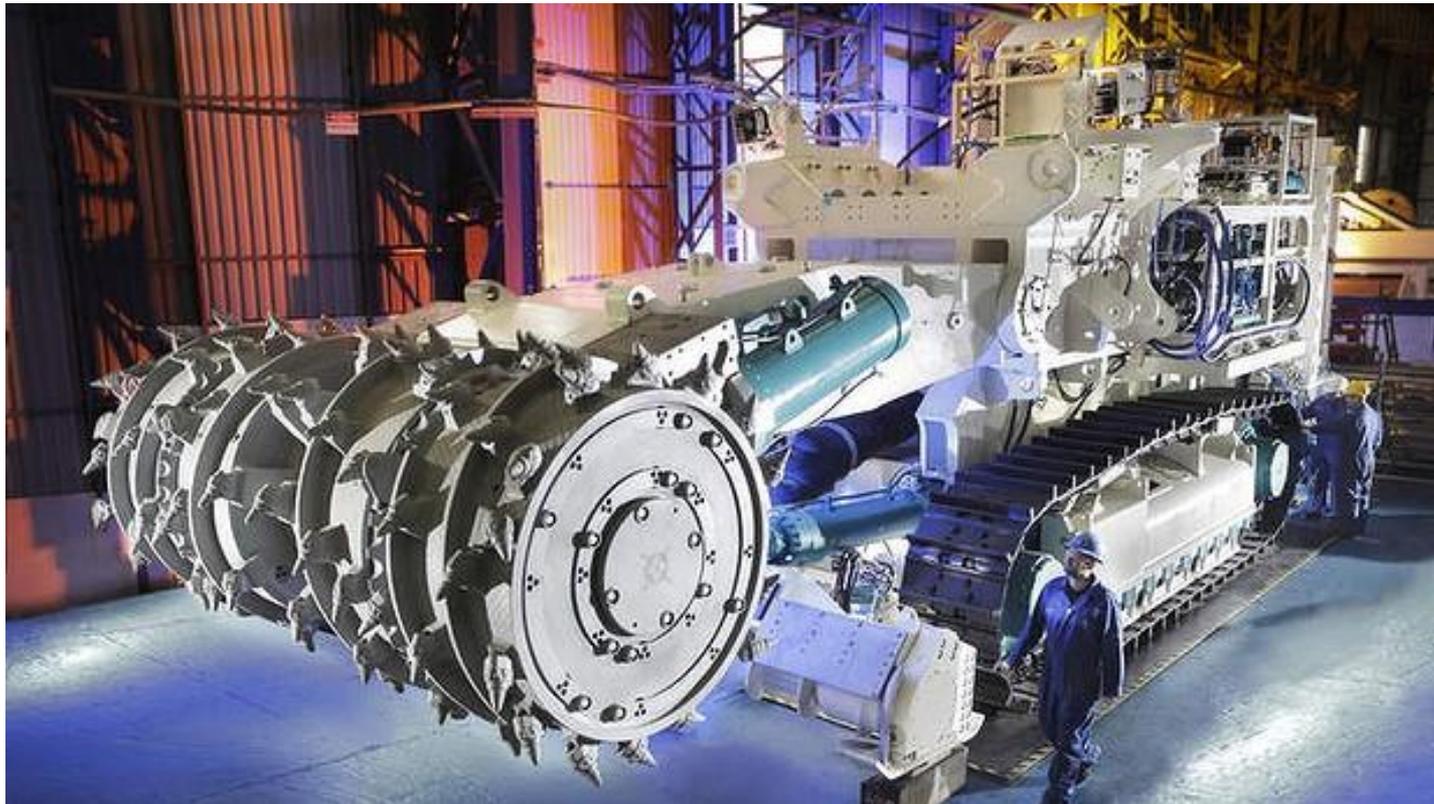


Bulk Cutter (BC) - cuts material at high rates on area benching by Auxiliary Cutter



Collecting Machine (CM) - collects cut material with seawater, pumping and transfers the slurry to the RALS

Trial phase (production set to start in 2018)



Seafloor production tool named "bulk cutter", built in Newcastle-upon-Tyne for the world's first attempt at deep sea mining (Photo: Nautilus Minerals)

Nautilus Minerals is a Canadian, publicly traded, mining company. Significant shareholders are the Omani oilfield services billionaire Mohammed Al Barwani (28.14%), Russia's richest tycoon Alisher Usmanov's Metalloinvest Holding Ltd (20.89%) and Anglo American (5.99%). (Source: Nautilus Minerals as of 30 September 2015)

The state of Papua New Guinea holds a 15% stake in Solwara I.

Mineral resources in the Pacific

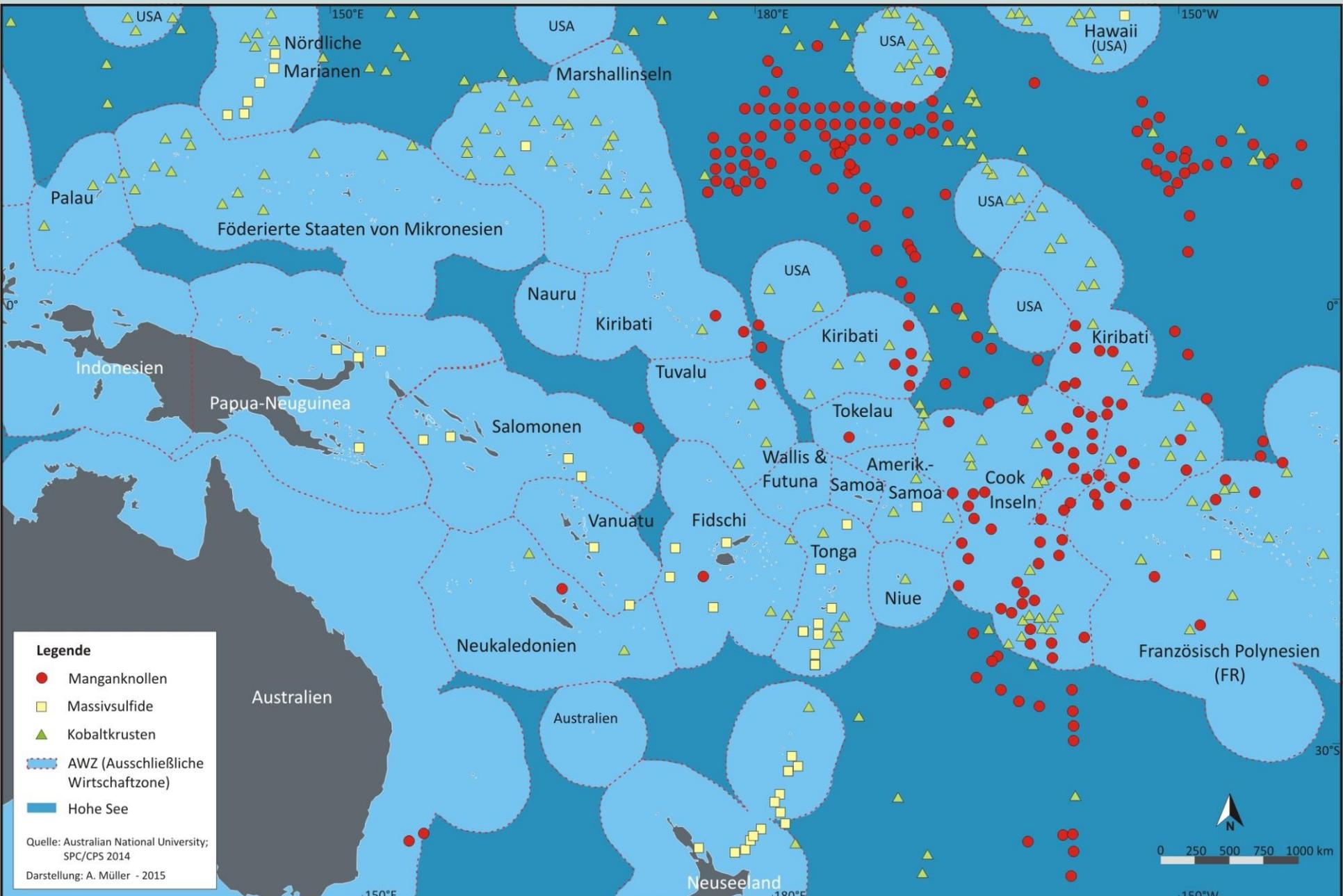




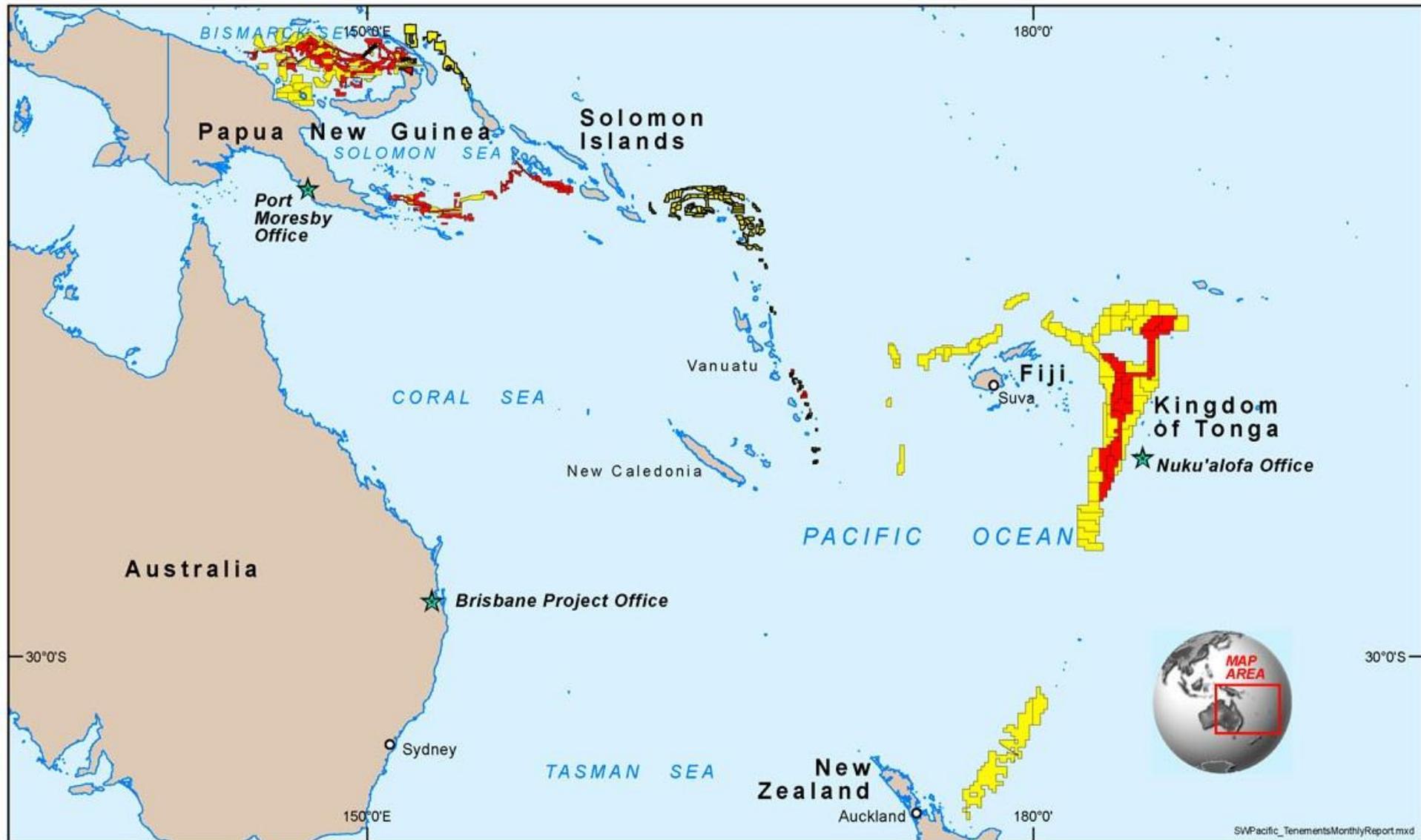
Figure 7 SOUTHWEST PACIFIC REGION LOCATION OF TENEMENTS

November 2010 © Nautilus Minerals

- Tenement - Application
- Tenement - Granted

SW Pacific Office Locations - Nautilus Minerals

0 500 1,000 km
Plate Carree Projection, WGS84 Datum.



SWPacific_TenementsMonthlyReport.mxd

Source: www.nautilusminerals.com



Figure 2 BISMARCK SEA AREA, PAPUA NEW GUINEA LOCATION OF TENEMENTS

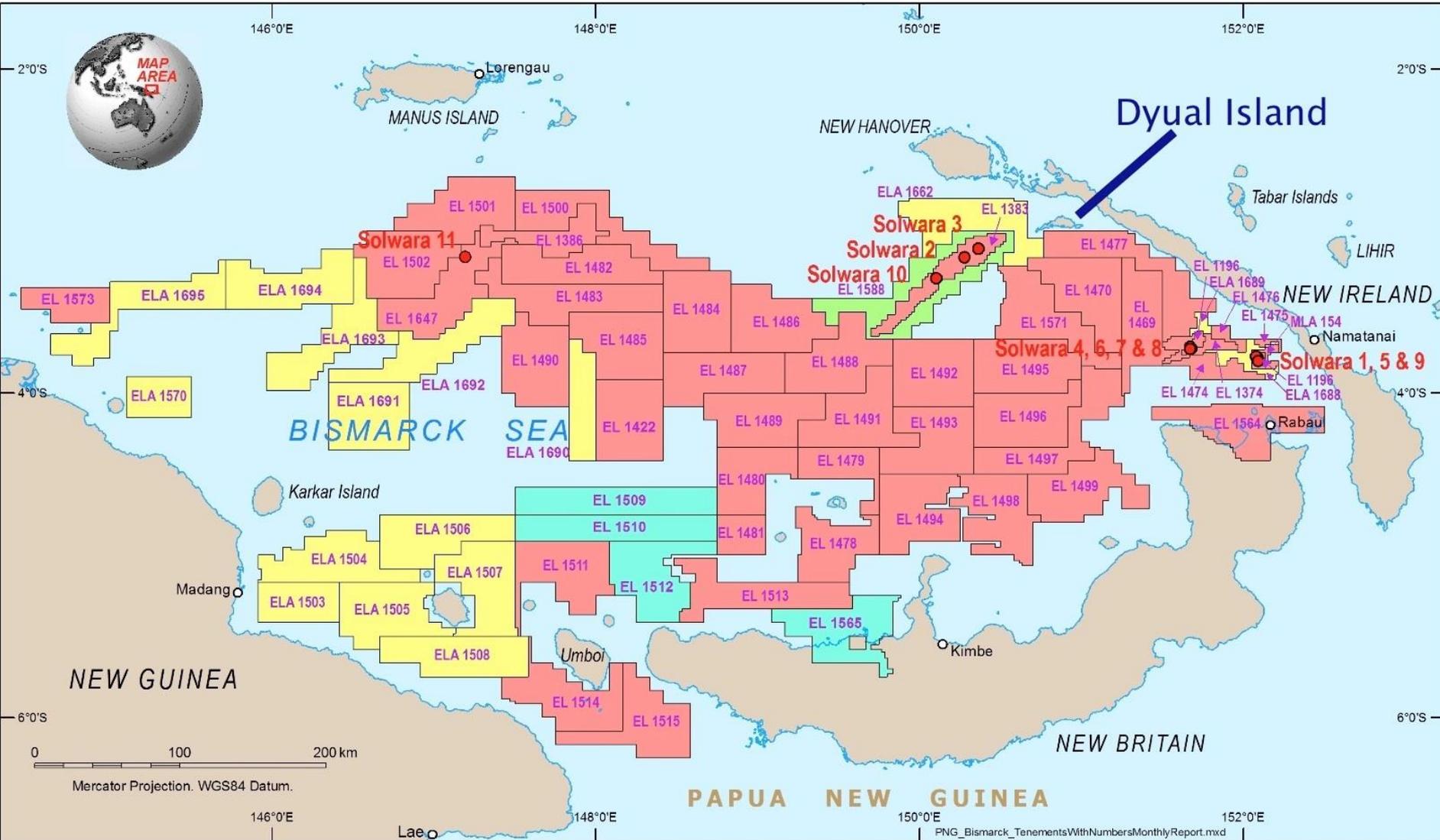
March 2009 © Nautilus Minerals

Exploration Licences

- Granted, 100% Nautilus
- Granted, Teck (transfer to Nautilus pending)
- Surrendered, 100% Nautilus
- SMS system

Exploration Licence Applications

- 100% Nautilus



Mojib Latif, climatologist: “The end of the oceans” Overfishing



Shrimp by-catch on the east coast of Florida; photo: NOAA, Image ID: fish0775, NOAA's Fisheries Collection, public domain.

The ocean as a garbage disposal site



Port Moresby in Papua New Guinea 2011. Photo: Roland Seib

Maritime pollution: Deep sea exploitation of oil



BP in the Gulf of Mexico, "Deepwater Horizon" (2010), Photo: REUTERS/ U.S. Coast Guard, Spiegel Online 6.10.2015

Climate change: rise in sea level leads to lost future

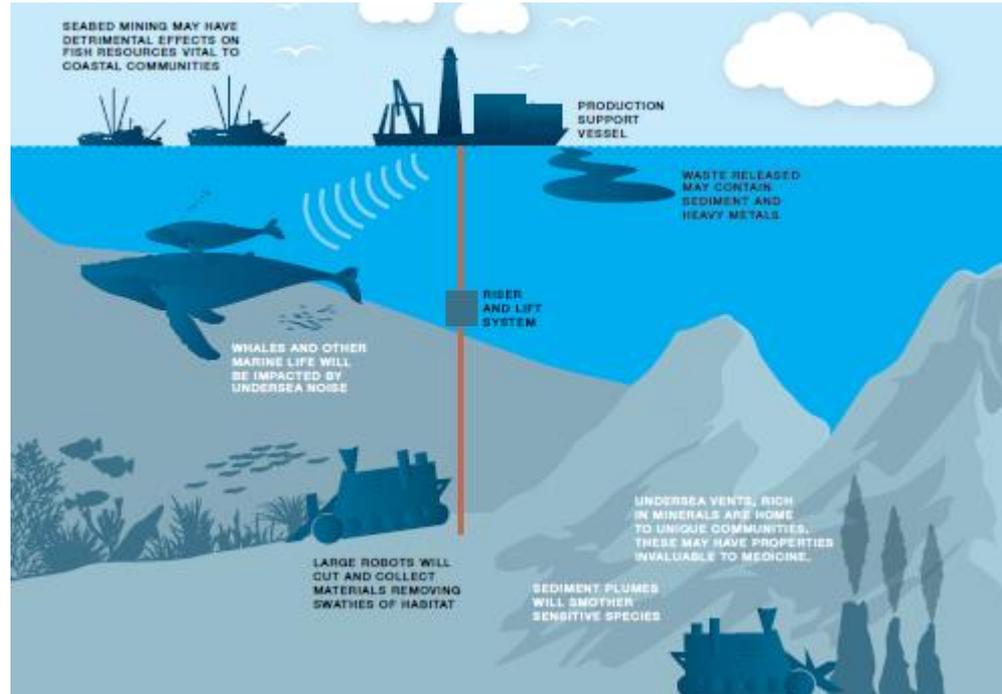


Kranket Island 2015. Many Pacific islands are only a few meters above sea level.
Photo: Sylvie Kunz



A test mining track (1.5 m wide) created 26 years ago on the seafloor in the Clarion Clipperton Zone illustrating the extremely slow recovery of abyssal ecosystems from physical disturbance. Photo: Center for Ocean Solutions 9 July 2015, Copyright Ifremer, Nodinaut Cruise (2004).

The geologist Dr Chris Yeats of the Australian Research Institution *Commonwealth Scientific and Industrial Research Organisation (CSIRO)* warns: „we know more about the surface of the Mars and Venus than we know about the deep ocean floor, broadly speaking it is a great unknown.“ (Source: The Global Mail, 6 December 2013)

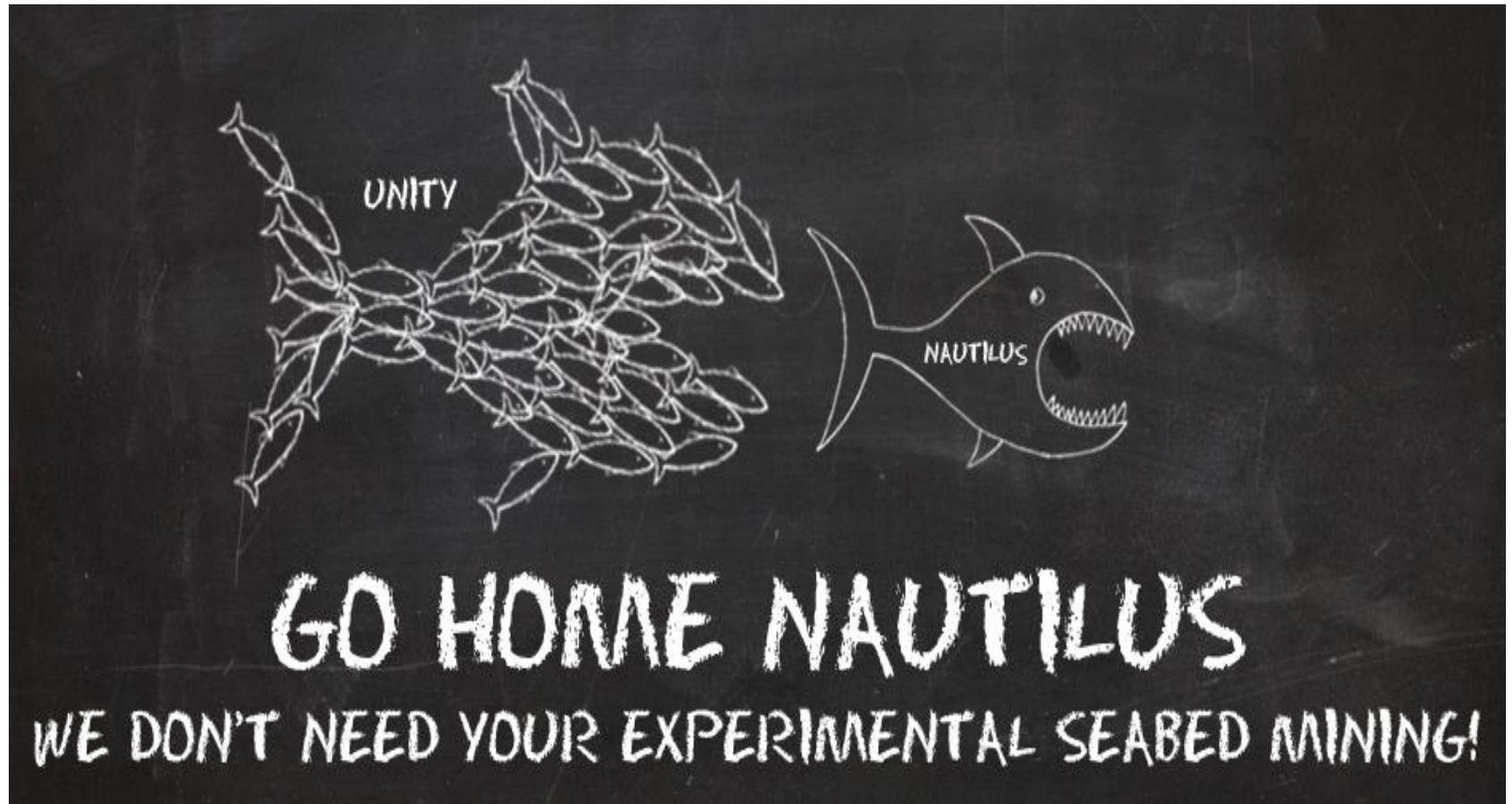


Source: Greenpeace: Deep Seabed Mining, 2013: 7

- Seabed sediments are stirred up, drifting with the current and damaging other habitats,
- Organisms die with the absorption of the material, if not before,
- The release of sediment and heavy metal-containing waste water causes a sediment cloud,
- Noise, vibration, lights and pollution caused by harvesting robots and ships can disturb, damage or disperse seabirds, fish and marine mammals.
- Possible consequence: massive pollution of the local seabed environment, resulting in the degradation of maritime resources for neighboring residents.

Identifiable developmental consequences exemplified by Papua New Guinea

- Adjacent coastal communities and provincial governments are neither stakeholders nor contracting parties.
 - Civil society is not engaged.
 - State laws for management and regulation are lacking or inadequate. Regulation is incumbent on the company.
 - Control of environmental impact on the seabed by regulatory authorities is not feasible.
 - Capital-intensive production, therefore hardly any jobs will be generated.
 - Further processing takes place overseas.
 - Security of supply of coastal residents is threatened by incalculable ecological consequences.
 - This further threatens the local, national and regional economy, e.g. fishing industry and the tourism sector.
 - The 20-year mining boom has not yet been reflected in economic participation of the people and reducing poverty in the country.
- **Résumé:** privatisation of the common property sea in favor of private sector and government at the expense of the population.



Source: www.deepseaminingoutofourdepth.org



STOP OCEAN CRIME



SAY "NO" TO:
Seabed Mining; Mine Tailing Dumping;
Industrial Waste Dumping; Riverine
Dumping; & Water Pollution

PNGASEM

NEW GUINEANS AGAINST EXPERIMENTAL SEABED MINING



DEEP SEA MINING CAMPAIGN

A PROJECT OF THE OCEAN FOUNDATION

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PROTECT OUR OCEANS.

Our Oceans Are Already Under too Much Pressure.

SAY NO TO DEEP SEA MINING



What Is Deep Sea Mining?

Deep sea mining is a new and untested industry to mine the ocean floor.

[Learn more](#)

What Is At Risk?

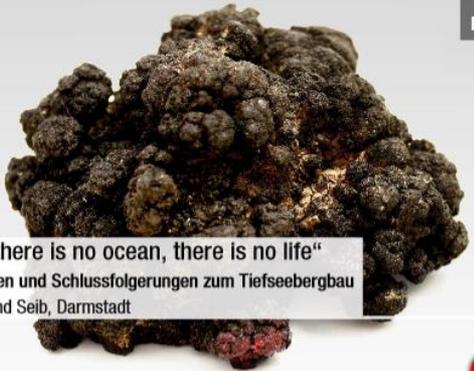
There is uncertainty about the risks to marine environments and communities.

[Learn more](#)

What Can I Do?

Get informed through our website and take action.

[Learn more](#)



Fact Sheet

„If there is no ocean, there is no life“
Fakten und Schlussfolgerungen zum Tiefseebergbau
 Roland Seib, Darmstadt



1. Einführung und Schlussfolgerungen

Der Startschuss für die weitere Erkundung von Rohstoffen in der Tiefsee ist gefallen. Am 6. Mai 2015 haben der Generalsekretär der Internationalen Meeresbodenbehörde, Nii Alitley Odunton, und der Präsident der Bundesanstalt für Geowissenschaften und Rohstoffe, Hans-Joachim Kämpel, im Berliner Bundeswirtschaftsministerium einen Lizenzvertrag zur Erkundung von Massivsulfid-Lagerstätten unterzeichnet. Dieser tritt neben eine bereits bestehende Lizenz zur Exploration von Manganknollen. Die Vertragsunterzeichnung ist für die Bundesregierung ein wichtiger Meilenstein auf dem Weg zum Zukunftsprojekt kommerzieller Tiefseebergbau, in dem Deutschland mit Staaten wie Großbritannien, China und Russland im globalen Wettlauf um Ressourcensicherung und Meerestechnologie konkurriert.

Obwohl mineralische Rohstoffe schon seit Jahrzehnten aus den küstennahen Meeren gefördert werden, stehen wir heute an der Schwelle einer neuen Ära, so Michael Lodge, der stellvertretende Generalsekretär der Internationalen Meeresbodenbehörde ISA. Mehr noch sieht er schon jetzt einen Goldrausch, da die Zahl der Aktivitäten exponentiell zugenommen habe. Regierungen und Konzerne arbeiten mit Hochdruck am Einstieg in den Tiefseebergbau. Dabei sollen Hunderte von Millionen Tonnen metallhaltiger Mineralien vom Meeresboden geerntet werden.

Manganknollen aus dem Pazifik enthalten vor allem Magnesium und Eisen, aber auch Silber, Aluminium, Nickel, Kupfer und Cobalt.
 (© BGR Hannover)

DISKUSSIONSPAPIER



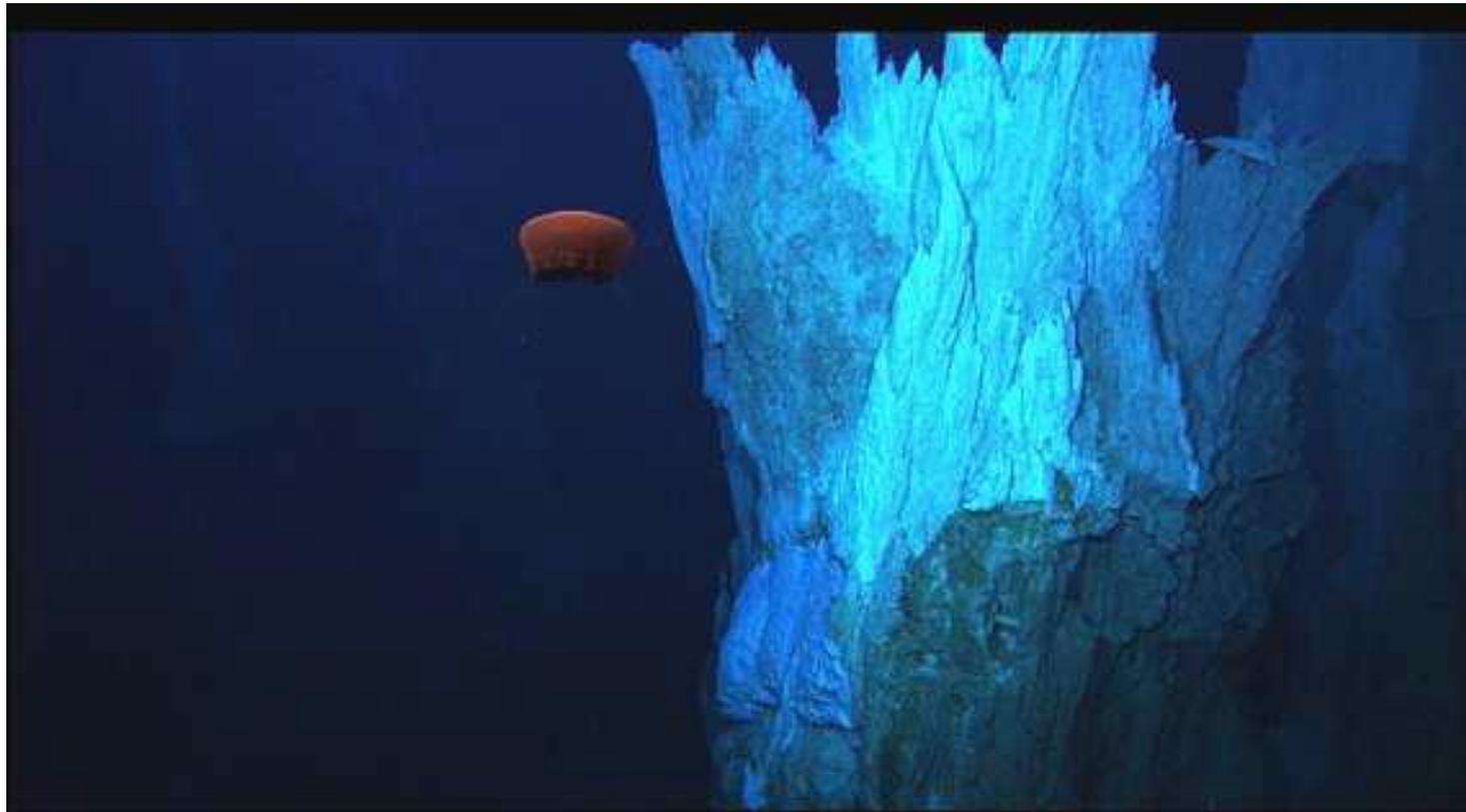

Tiefseebergbau

Unkalkulierbares Risiko für Mensch und Natur
 Im Fokus – der Pazifik





Even this impressive angler fish will not be able to protect its deepwater habitat against exploitation (Photo: The Epoch Times, 26 February 2014)



Deep sea-Jellyfish (Image courtesy of National Oceanic and Atmospheric Administration/NOAA)

Thank you for your attention!