



DEEP SEA CLUSTER



GEOSYSTEMS AND MINERAL RESOURCES IN THE TRANSITION «CONTINENT-OCEAN»? ZONES AND OPEN OCEAN **GEOMIR**

Renat B. Shakirov and GEOMIR Team

Ministry of Science and Higher Education

Russian Academy of Sciences

V. I. Il'ichev Pacific Oceanological Institute

Vladivostok, Russian Federation

ren@poi.dvo.ru

GEOMIR CONSORTIUM

- Marine scientific, exploration and educational institutions of Arctic, Pacific and Indo-Pacific regions: start from 46 at today. European cooperation (GEOMAR, AWI, MARUM and everybody) invited.
- Commercial partners: geological and geophysical exploration and prospecting companies, data base Centers, marine law: confirmed and under confirmation
- Oceanographic Communities (WESTPAC, CCOP, NEAR GOOS, JpGU, IGU and others): members participants
 - International Research Fleets
 - others

SEABED and CONTINENTAL FRAMES – «CRADLE OF THE OCEAN»

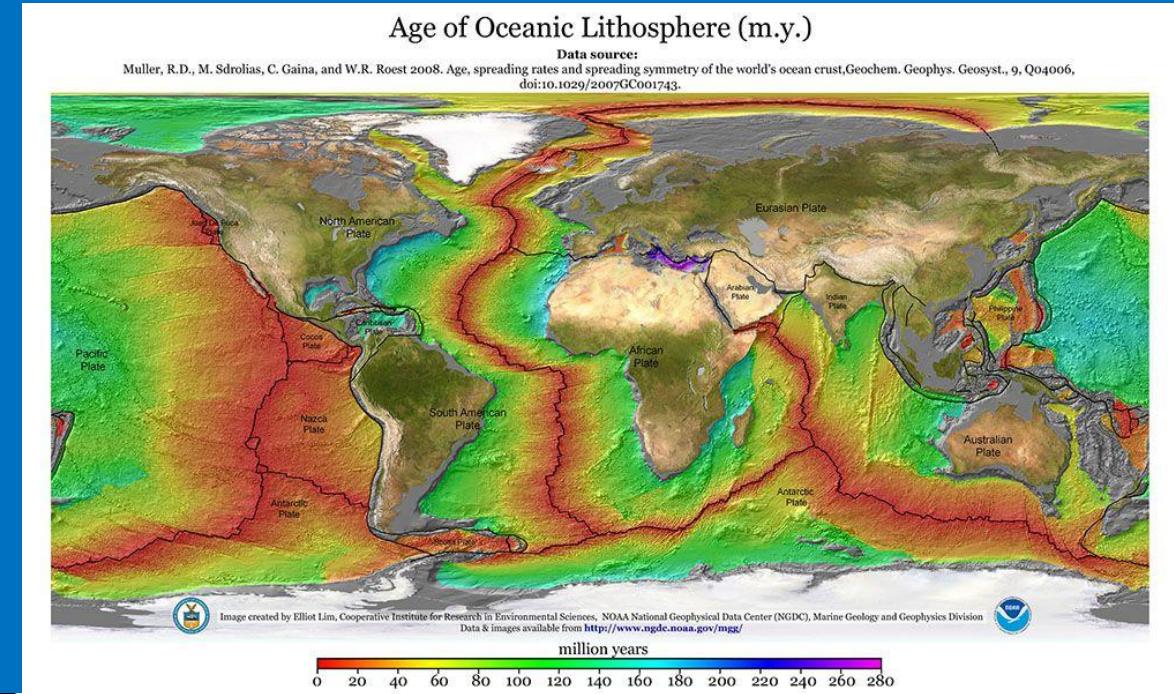
“GEOSYSTEM - relatively holistic territorial entity formed in close interconnection and interaction of nature, population and economy, the integrity of which is determined by direct, reverse and transformed connections developing between subsystems..” Academician V.B. Sochava

Fe-Mn nodules



Continental Margin Type
■ Active
■ Passive

Web- published sources

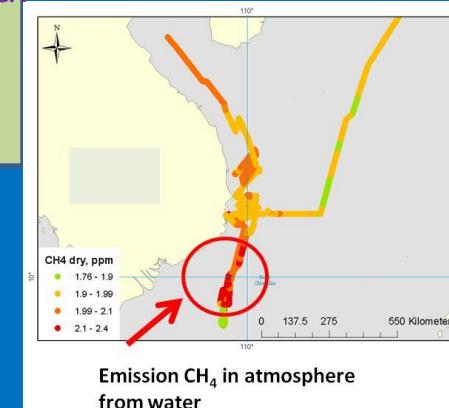


Coordinated Annual Surveys. Russian research vessels: more than 30 deep sea expeditions annually



INTEGRATED GEOMAPPING for sustainable development

- DEEP SEAFLOOR MAPPING (geomorphology, sea floor dynamics, sediments, rocks)
 - DEEP NON-CONVENTIONAL RESOURCES (gashydrates, Fe-Mn, V, Ti, Co, Fe, REE ..)
 - DEEP ECOSYSTEMS (find new, study and monitoring discovered structures)
-
- GEOLOGICAL HAZARDS (earthquakes, landslides, tsunami, volcanoes, faults)
 - VOLATILES FLUXES MAPPING (natural VS anthropogenic)
 - GAS-FLUID CYCLES (H₂O, HYC, CH₄, CO₂, H₂S, H₂, He..)
 - PARTICLES FLUXES (terrestrial, marine snow et cet)
-
- MINERAL RESOURCES OF THE WATER COLUMN (Salt, Mn..)
 - DEEP SEABED PROPERTIES: color, mechanical, physical, chemical
 - DEEP SEA SEDIMENTS - mineral resource itself
 - GREAT LAKES – study to save
 - RADIONUCLIDE SITES (human storages)
 - SUBMARINE ARCHAEOLOGY



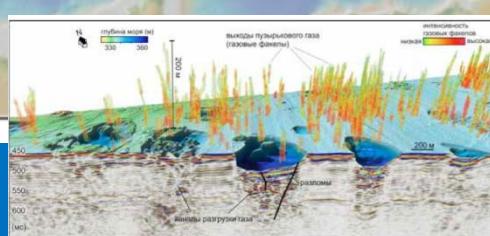
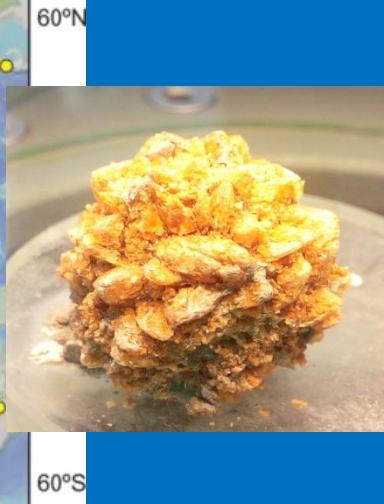
Integrated geological and geophysical surveys on the seabed gas-fluid emission zones as a basis for sustainable development

Interior Breath via the Seabed: cradles of unique COLD ecosystems

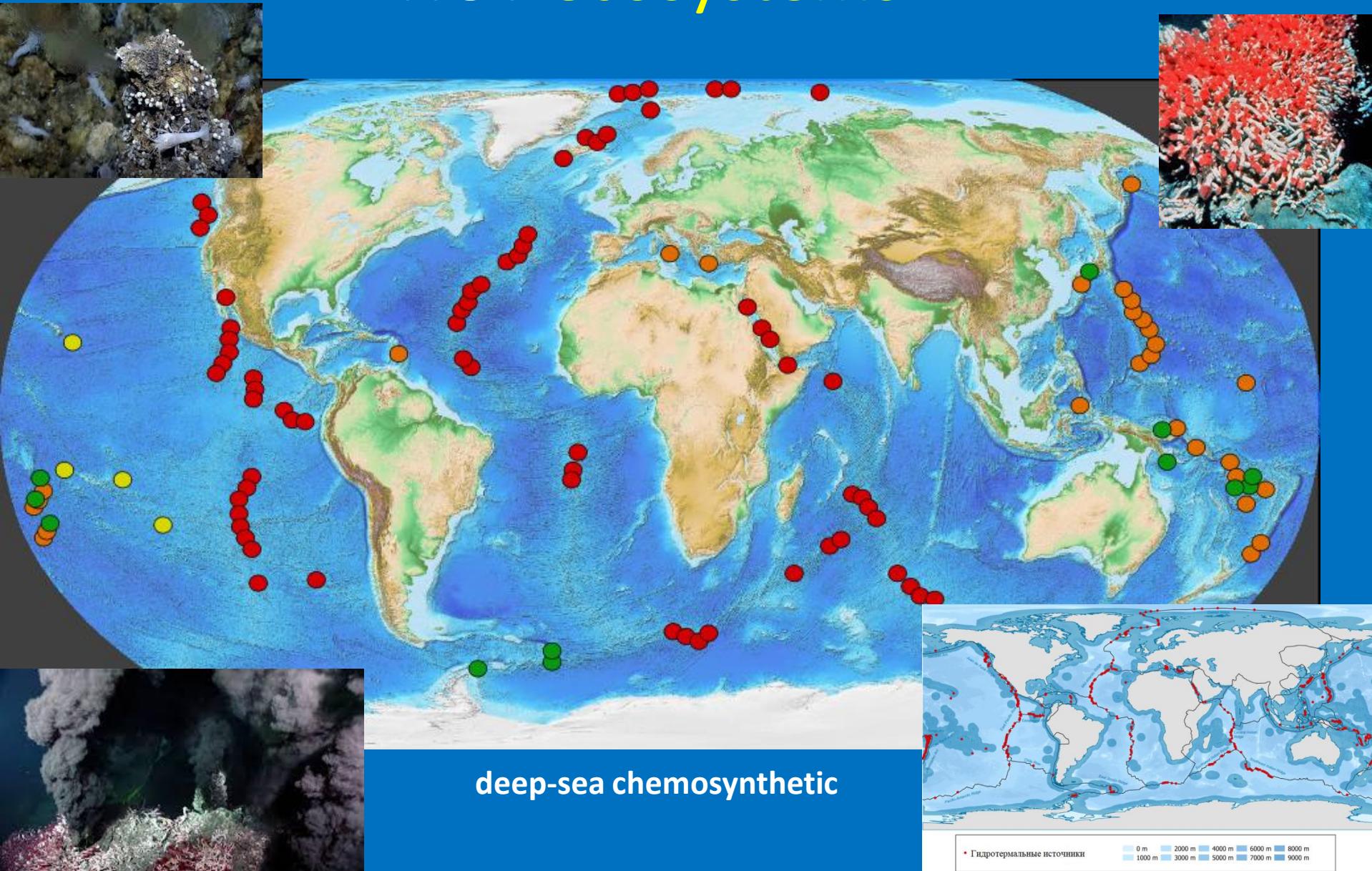
Frozen CH₄ bubbles



"Mussels in CH₄"

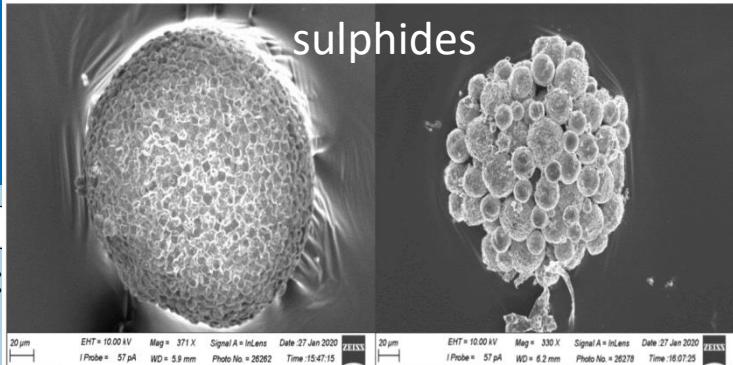


Hydrothermal vents: cradles of unique HOT ecosystems

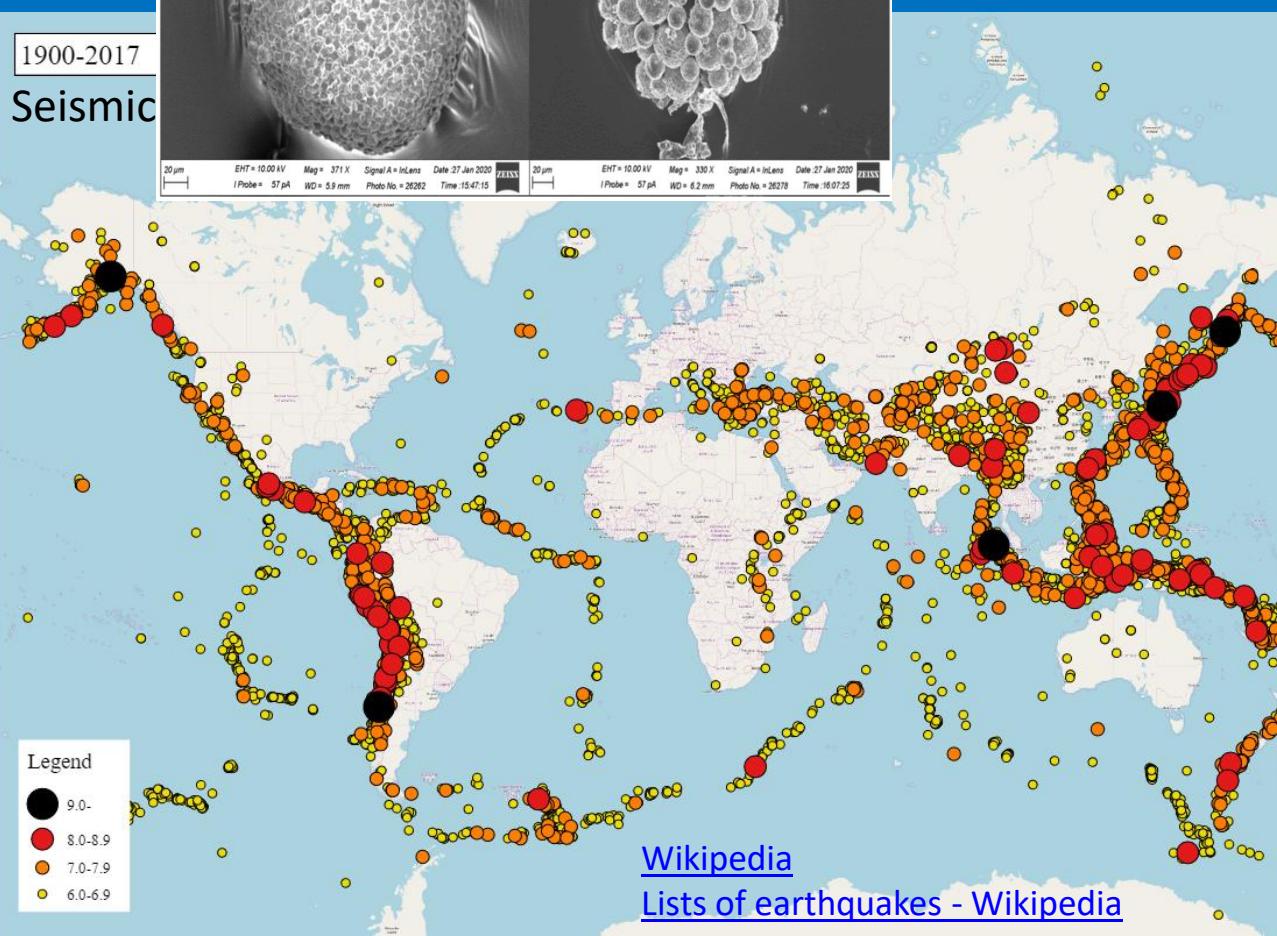


EARTHQUAKES AFFECTING «CRADLE»

A LOT OF NON CONVENTIONAL MINERALS LINKED TO GAS-FLUID EMISSION ZONES

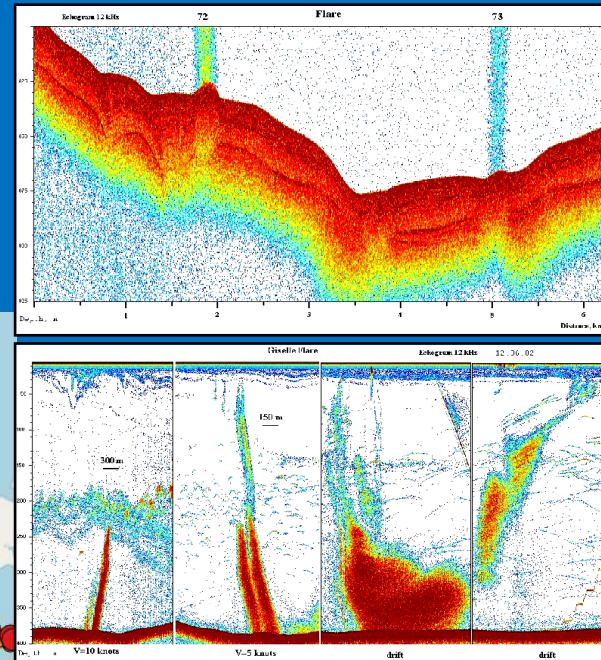


1900-2017
Seismic



[Wikipedia](#)
[Lists of earthquakes - Wikipedia](#)

METHANE FLUXES



UNIQUE CALCITE



Deep Sea Minerals: distribution still unknown

(ferromanganese
crusts, sulphides,
phosphorites, REE,
noble metals, non-
conventional and
others)



Pacific Ocean

Japan Sea (Russian EEZ)



Marine polymetallic sulphides – Germany's exploration license in the Indian Ocean



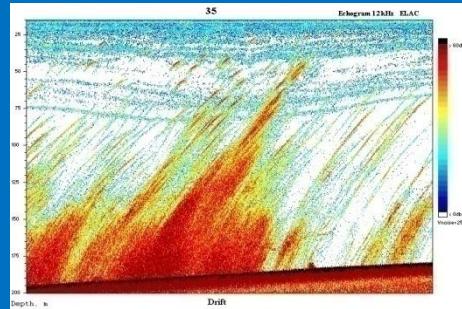
New mineral resource of South-China Sea

DEEP SEA CLAY-CARBONATE MUD (RV "Akademik M.A. Lavrentyev", 2019)

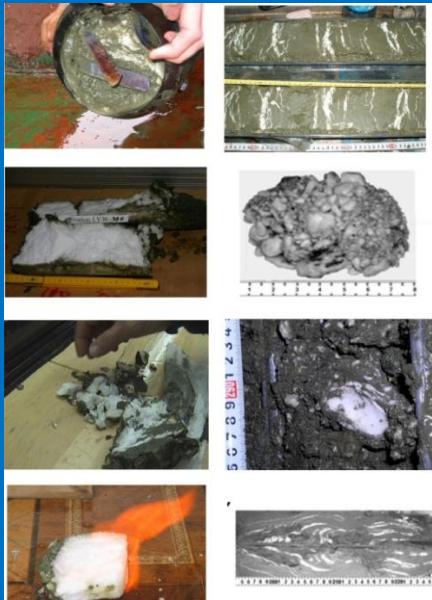


WESTPAC Working Group (April 2021) on Gas hydrates and Methane Fluxes in the Indo-Pacific-Arctic (from 2021) (CoSGas)

Methane flare



Gashydrates



Proposing area of CoSGas



Co-Chairs:

Prof. Anatoly Obzhirov, Russia obzhirov@poi.dvo.ru

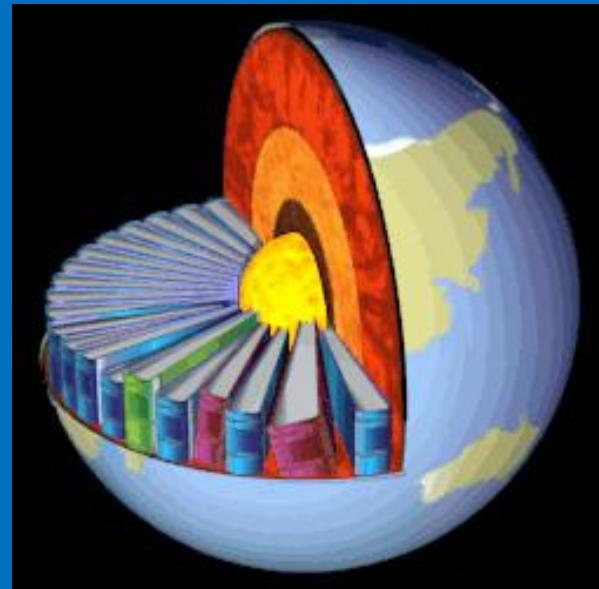
Prof. Ryo Matsumoto, Japan ryo_mat@meiji.ac.jp

Prof. Nengyou Wu, China wuny@ms.giec.ac.cn

OUTCOMES exposed via COMMUNICATION STRATEGY using IT GEONETWORK

- GEOMAPS
- OPEN REPORTS
- GEODATA EXCHANGE
- DIGITAL GEODATA BASIS
- PRACTICAL “MARINE GEOBIOBANK”
- GEOMICROBIAL MAPS
- FORECAST GEOMODELLING
- HR: ‘OCEANIC’ GENERATION
- FRIENDSHIP
- *To be continue*

OCEAN OF KNOWLEDGE



“FLOATING UNIVERSITIES”

Students, early carrier scientists, gender balance



Thank you for attention!

CONNECT THE BRIDGES FOR GREATER
SUSTAINABILITY!



Welcome to Vladivostok