Special Seminar
Efforts for Saving the Aral Sea through International Cooperation:
Past, Present and Future
Japan, March 19, 2025

Past, Present and Future of the Aral Sea

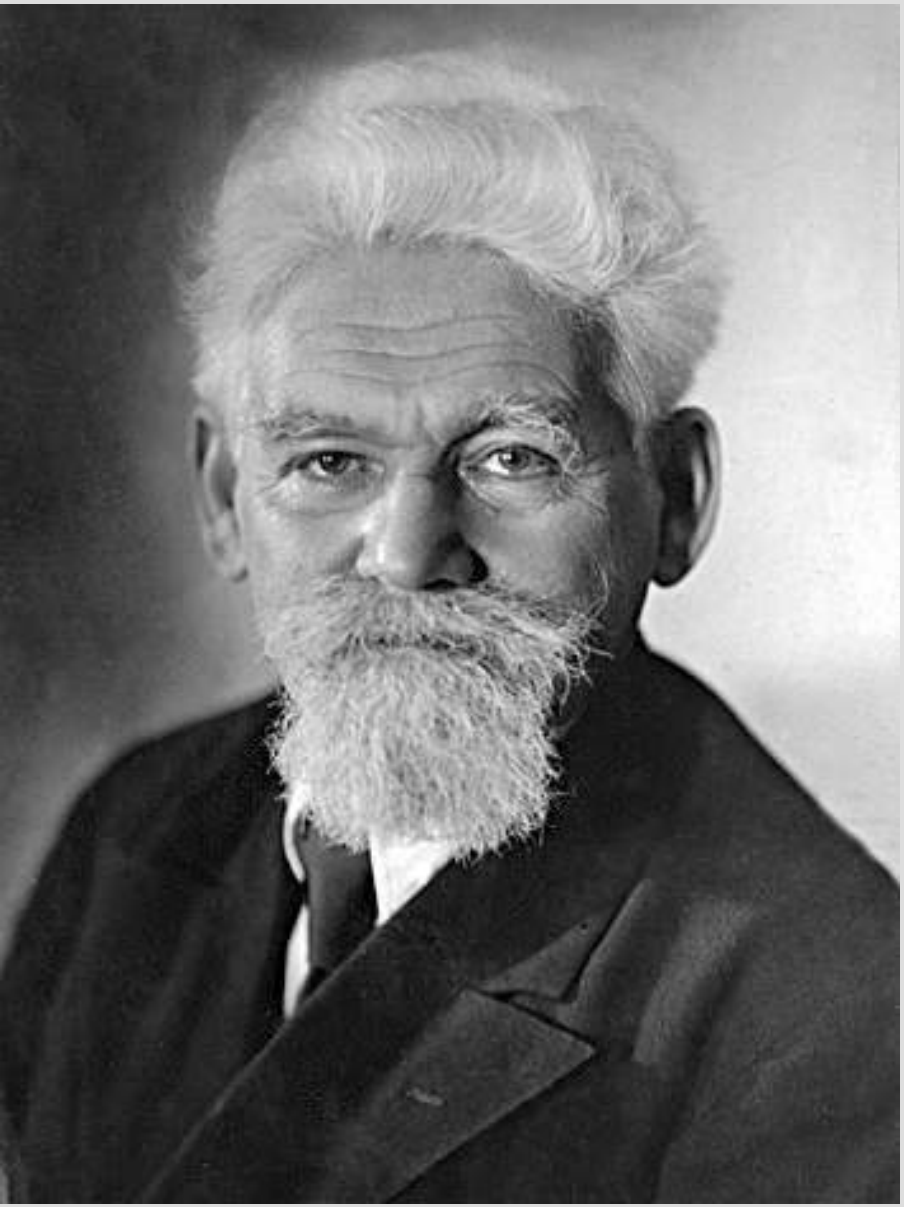
Aladin N., Gontar V.,
Plotnikov I., Smurov A., Zhakova L.
Laboratory of Brackish Water Research,
Zoological Institute of the Russian Academy of Sciences

- The first significant research on the Aral Sea was carried out in 1848-1849. expedition led by Lieutenant Alexei Ivanovich Butakov.
- A general reconnaissance of the Aral Sea was carried out, a depth measurement was made, a complete survey of Barsa-Kelmes Island was made, a group of Renaissance islands was discovered and studied, astronomical determinations were made with the organization of a network of astronomical points, meteorological observations, an inventory of the ice situation in winter, a collection of samples of minerals transferred then to the Petersburg Mining Institute, and flora.
- January 27, 1849 Butakov was accepted as a full member of the Russian Geographical Society.

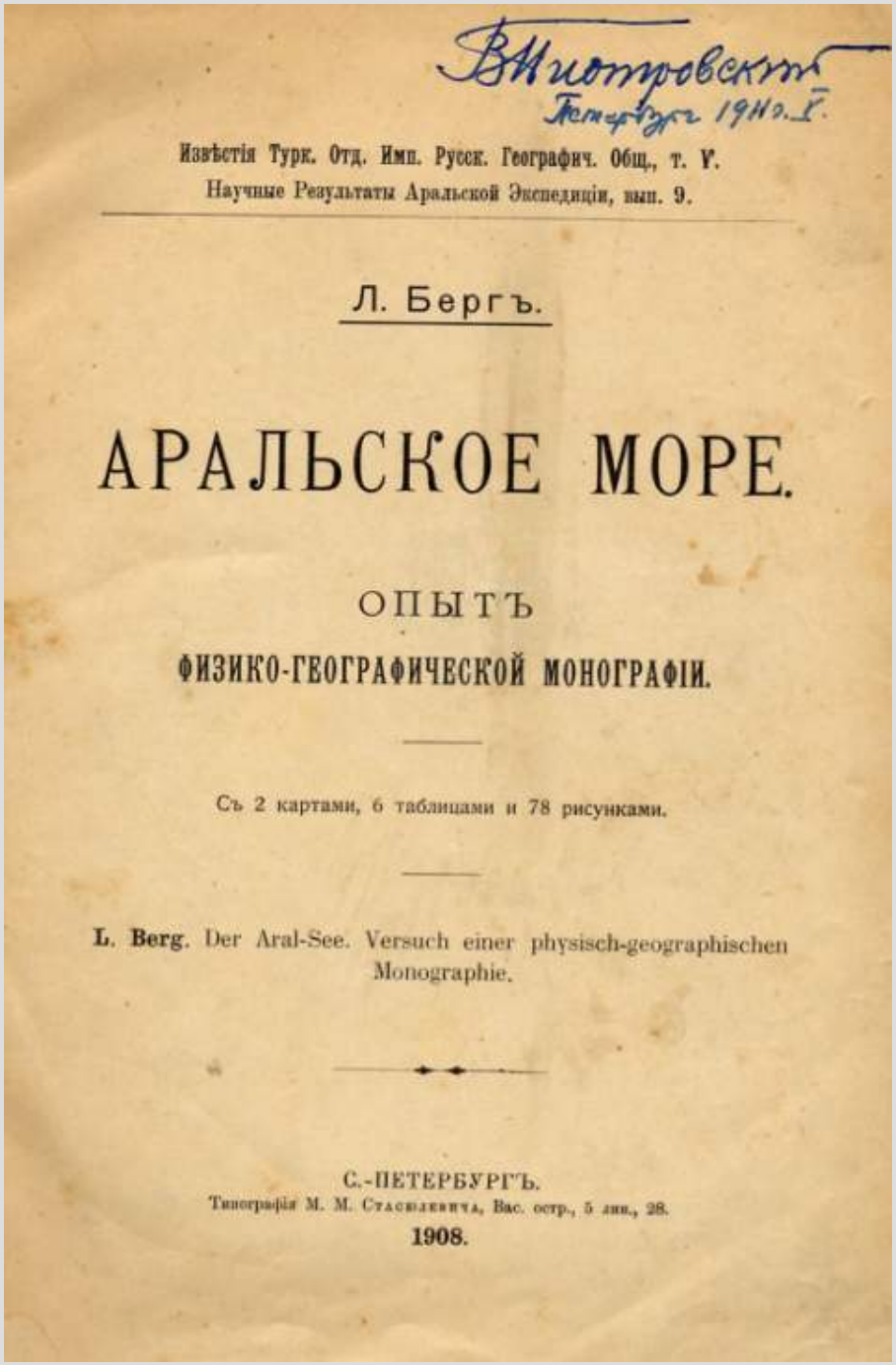
- Taras Grigoryevich Shevchenko, who was in exile in Orenburg, was accepted into the expedition as an artist.
- In addition to drawings, Shevchenko wrote more than 70 poems in Raim and Kosaral, some of which were born of Aral motifs.

Drawings from the expedition

Leo Berg(1876–1950)



- Geographer and ichthyologist, corresponding member (1928) and full member (1946) of the USSR Academy of Sciences, president of the Geographical Society of the USSR (1940–1950), laureate of the Stalin Prize (1951, posthumously).
- L.S. Berg was the first member of the staff of the Zoological Museum/Zoological Institute to study the Aral Sea.
- In 1900, the Turkestan Department of the Imperial Russian Geographical Society instructed him to complete in 1900-1902. a comprehensive study of the extremely poorly studied Aral Sea. For three seasons, Berg walked around the entire Aral Sea.
- He carried out the first comprehensive study of the Aral Sea, and he made the greatest personal contribution to the study of this reservoir.
- L.S. Berg conducted physical and geographical research, collected geological, paleontological, zoological, and botanical collections.
- He wrote a monograph dedicated to the fish of the Aral Sea.
- In 1906, Berg again visited the north of the Aral Sea and supplemented the previously collected materials



Известія Турк. Отд. Имп. Русск. Географич. Общ., т. V.
Научные Результаты Аральской Экспедиціи, вып. 9.

Л. Бергъ.

АРАЛЬСКОЕ МОРЕ.

ОПЫТЪ
ФИЗИКО-ГЕОГРАФИЧЕСКОЙ МОНОГРАФІИ.

Съ 2 картами, 6 таблицами и 78 рисунками.

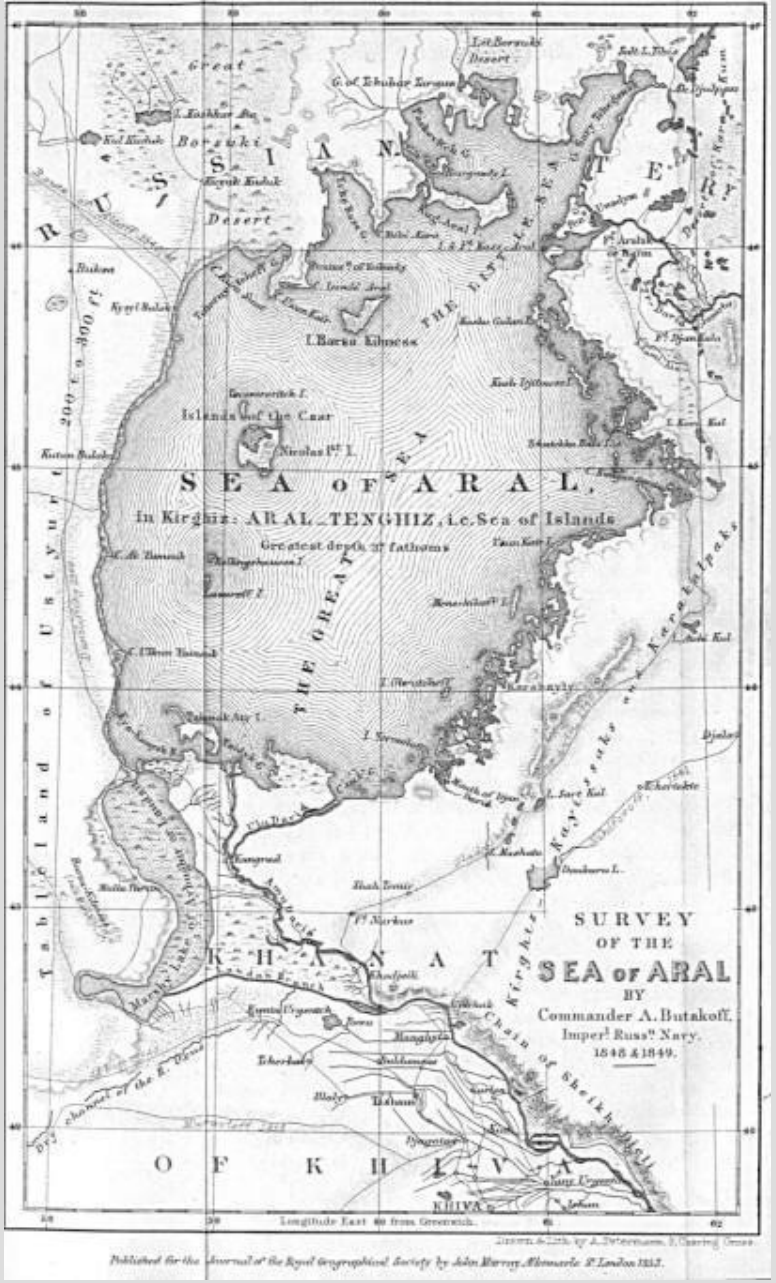
L. Berg. Der Aral-See. Versuch einer physisch-geographischen Monographie.

С.-ПЕТЕРБУРГЪ.
Типографія М. М. Стасюлевича, Вас. остр., 5 лин., 28.
1908.

- The knowledge about the Aral Sea available by the beginning of the 20th century and the whole huge amount of new data acquired thanks to the expedition, L.S. Berg summarized in his fundamental work “The Aral Sea. The experience of a physical-geographical monograph", published in 1908.
- The knowledge about the Aral Sea available by the beginning of the 20th century and the whole huge amount of new data acquired thanks to the expedition, L.S. Berg summarized in his fundamental work “The Aral Sea. The experience of a physical-geographical monograph", published in 1908.
- As a result, the first list of representatives of the flora and fauna of the Aral Sea appeared, which included: 110 species of unicellular and multicellular algae; 6 species of higher plants; 28 types of protozoa; 55 species of multicellular invertebrates and 18 species of fish.
- This book still retains its enduring value for all researchers of the Aral Sea.

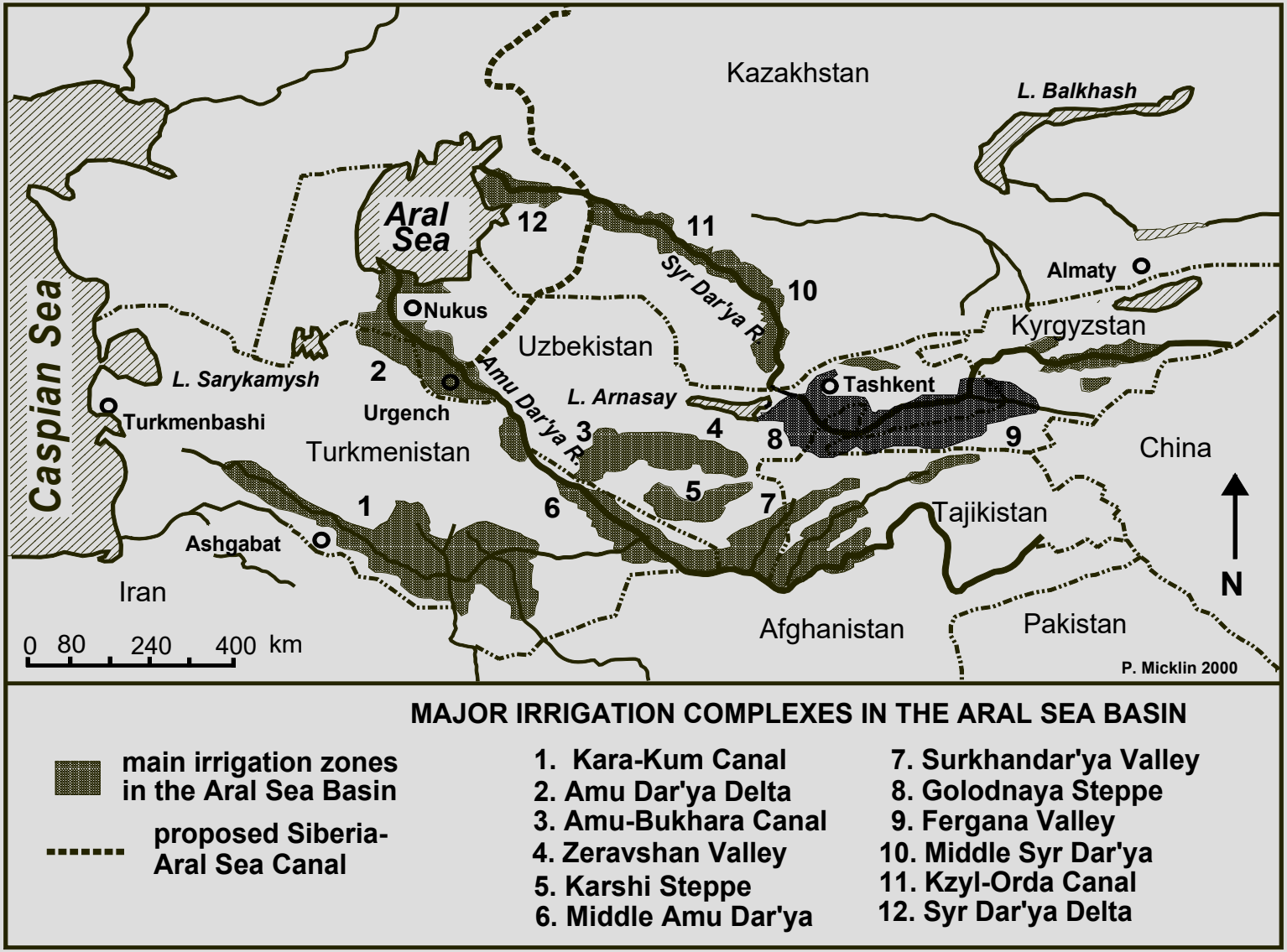

Commonwealth of Independent States - Central Asian States
The Aral Sea catchment area
The area of the Aral Sea basin is about 1.8 million km2
RUSSIA
KAZAKHSTAN
MONGOLIA
CHINA
ARAL SEA BASIN
Aral Sea
Caspian Sea
Lake Balkhash
TURKMENISTAN
UZBEKISTAN
KYRGYZSTAN
TAJIKISTAN
IRAN
AFGHANISTAN
PAKISTAN
INDIA
AZERBAIJAN
Nizhniy Novgorod
Perm'
Yekaterinburg
Tobol'sk
Achinsk
Krasnoyarsk
Ryazan'
Saransk
Ul'yanovsk
Naberezhnyye Chelny
Tambov
Penza
Kuznetsk
Tol'yatti
Samara
Ufa
Chelyabinsk
Kurgan
Troitsk
Petropavl
Ornsk
Barabinsk
Novosibirsk
Kemerovo
Abakan
Novokuznetsk
Barnaul
Biysk
Saratov
Volgograd
Volga-Don Canal
Oral
Orenburg
Aqtöbe
Onsk
Ekibastuz
Semey
Öskemen
Arqalyq
Qaraghandy
Ayagöz
Aqtoghay
Balqash
Saryshaghan
Taldyqoghan
Ürümqi
Embi
Maqat
Atyraü
Astrakhan
Shalqar
Zhezqazghan
Aral
Beyneu
Leninsk
Qyzylorda
Makhachkala
Aqtaü
Shü
Almaty
Zhambyl
Bishkek
Kara-Köl
Naryn
Tashkent
Shymkent
Nukus
Dashhowuz
Urganch
Türkmenbashi (Krasnowodsk)
Nebitdag
Gyzylarbat
Ashgabat
Chärjew
Mary
Termiz
Bukhoro
Navoiy
Jizzakh
Samarqand
Qarshi
Namangan
Osh
Ferghona
Kashi
Dushanbe
Qürghonteppa
Khorugh
Mashhad
Gushgy (Kushka)
Scale 1:16,500,000
Lambert Conformal Conic Projection, standard parallels 47°N and 62°N
0 300 Kilometers
0 300 Miles
Indian claim
Chinese line of control
Boundary representation is not necessarily authoritative.
802384 (R00030) 5-95

The Aral was the fourth lake in the world in terms of water area



Map of the Aral Sea, compiled based on the materials of the expedition of A. I. Butakov in 1848-1849

IRRIGATION DEVELOPMENT IN THE ARAL SEA BASIN



MAJOR IRRIGATION COMPLEXES IN THE ARAL SEA BASIN

main irrigation zones in the Aral Sea Basin

proposed Siberia-Aral Sea Canal

1. Kara-Kum Canal
2. Amu Dar'ya Delta
3. Amu-Bukhara Canal
4. Zeravshan Valley
5. Karshi Steppe
6. Middle Amu Dar'ya
7. Surkhandar'ya Valley
8. Golodnaya Steppe
9. Fergana Valley
10. Middle Syr Dar'ya
11. Kzyl-Orda Canal
12. Syr Dar'ya Delta

In the late 1980s, when the level dropped by 13 m and reached +40 m, the Aral Sea ceased to be a single body of water and was divided into the Small and Large Aral.

Area 40000 km2

(60% from 1960 г.)

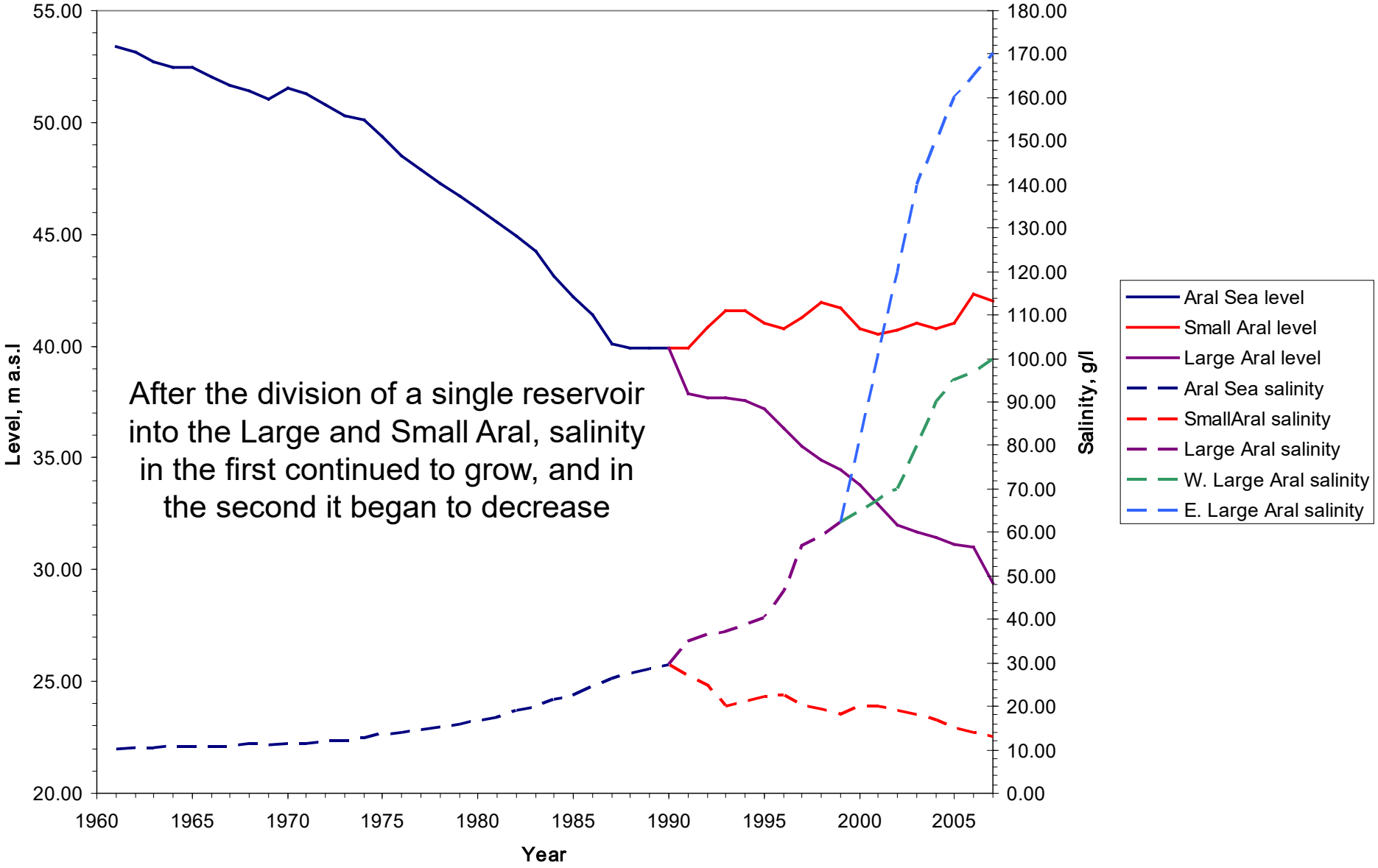
Volume 333 km3

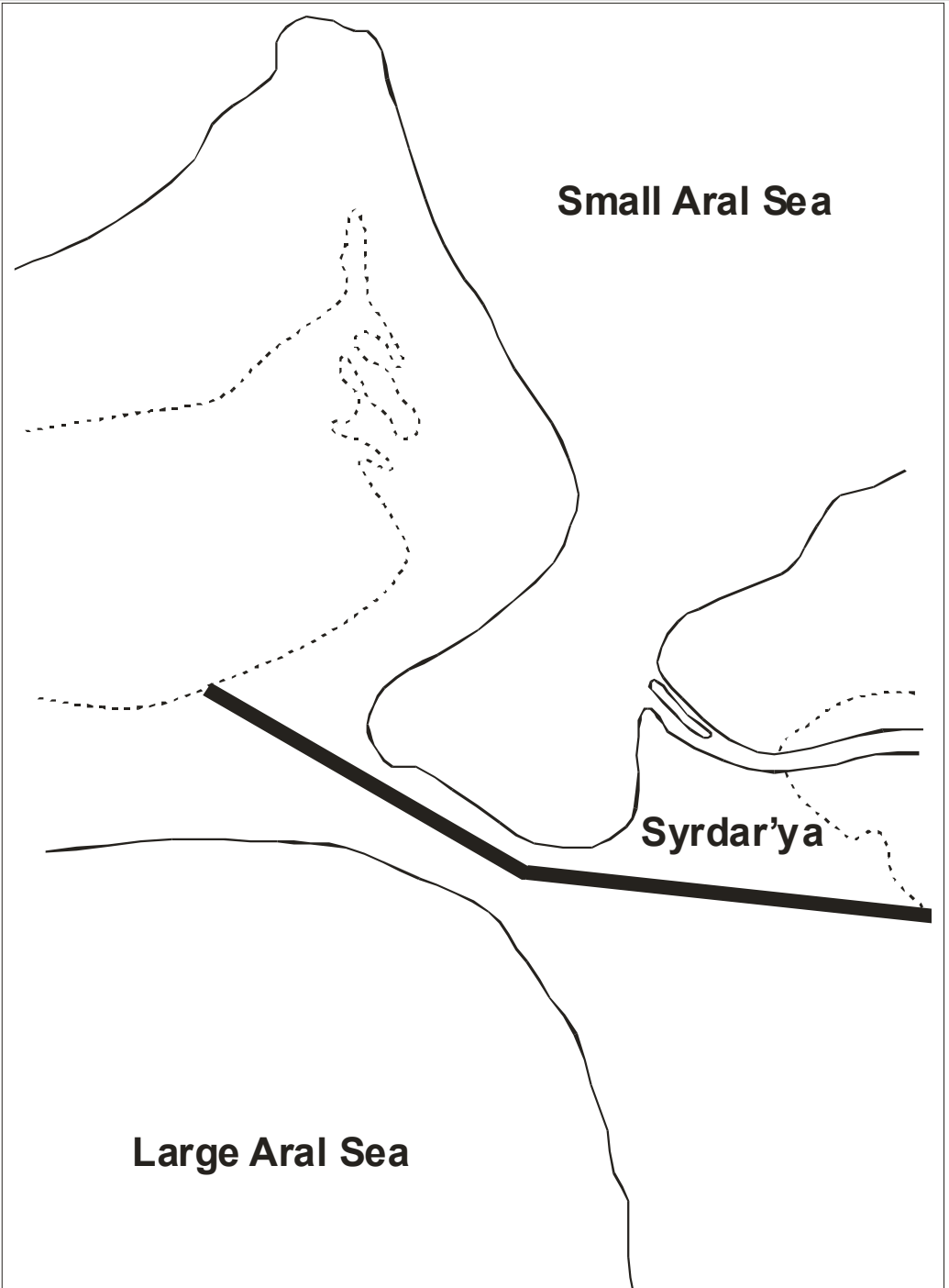
(33% from 1960 г.)

Salinity 30 g/l

(10 г/л in 1960 г.)

Changes in the level and salinity of the Aral Sea

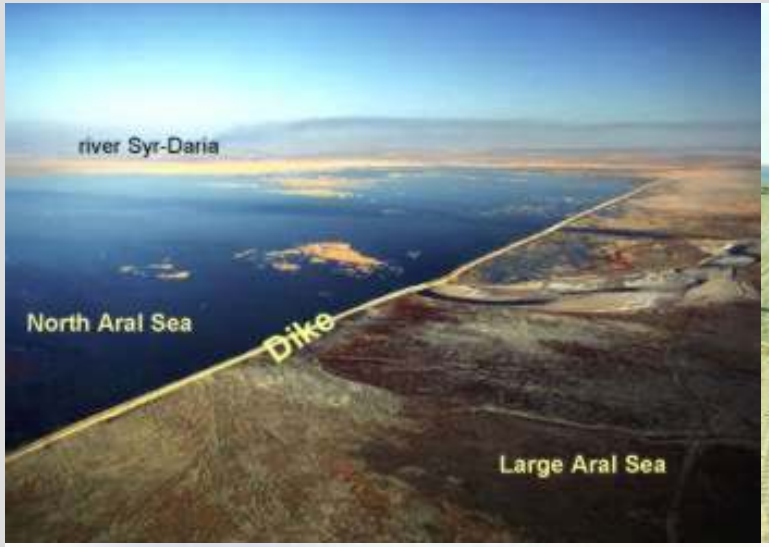




The dam in the Berg Strait helps to preserve the Small (Northern) Aral and contributes to the restoration of its biodiversity

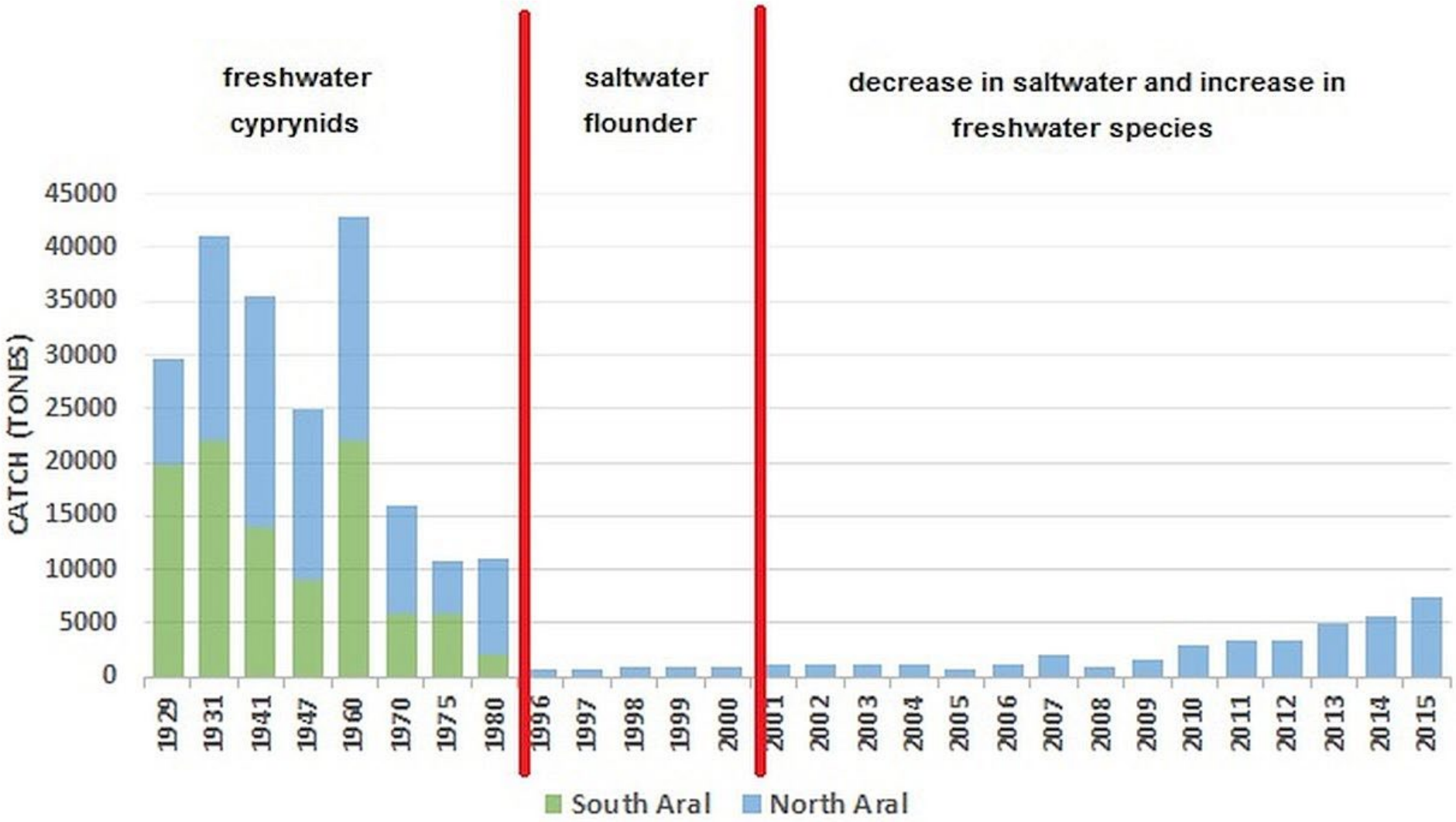
By: Aladin N.V., Plotnikov I.S., Potts W.T.W., 1995. The Aral Sea desiccation and possible ways of rehabilitation and conservation of its North part // Int. J. Environmetrics. Vol. 6: 17-29.

The dam was first built at our suggestion in August 1992.



After the construction of a dam in 1992 in the Berg Strait at the end of the 20th century, the fishery of the flounder universe continued in the Small Aral and native fish began to be caught.

Dynamics of catches in the northern and southern Aral



Green – southern Aral / Blue – northern Aral

Fish factory in the City of Aralsk

Artemia parthenogenetica appeared in the Large Aral at the end of the 20th century

Aral Sea 19.08.2014 (MODIS)

1 - dried up eastern basin of the Large Aral

2 - western basin of the Large Aral

3 - new Central Aral

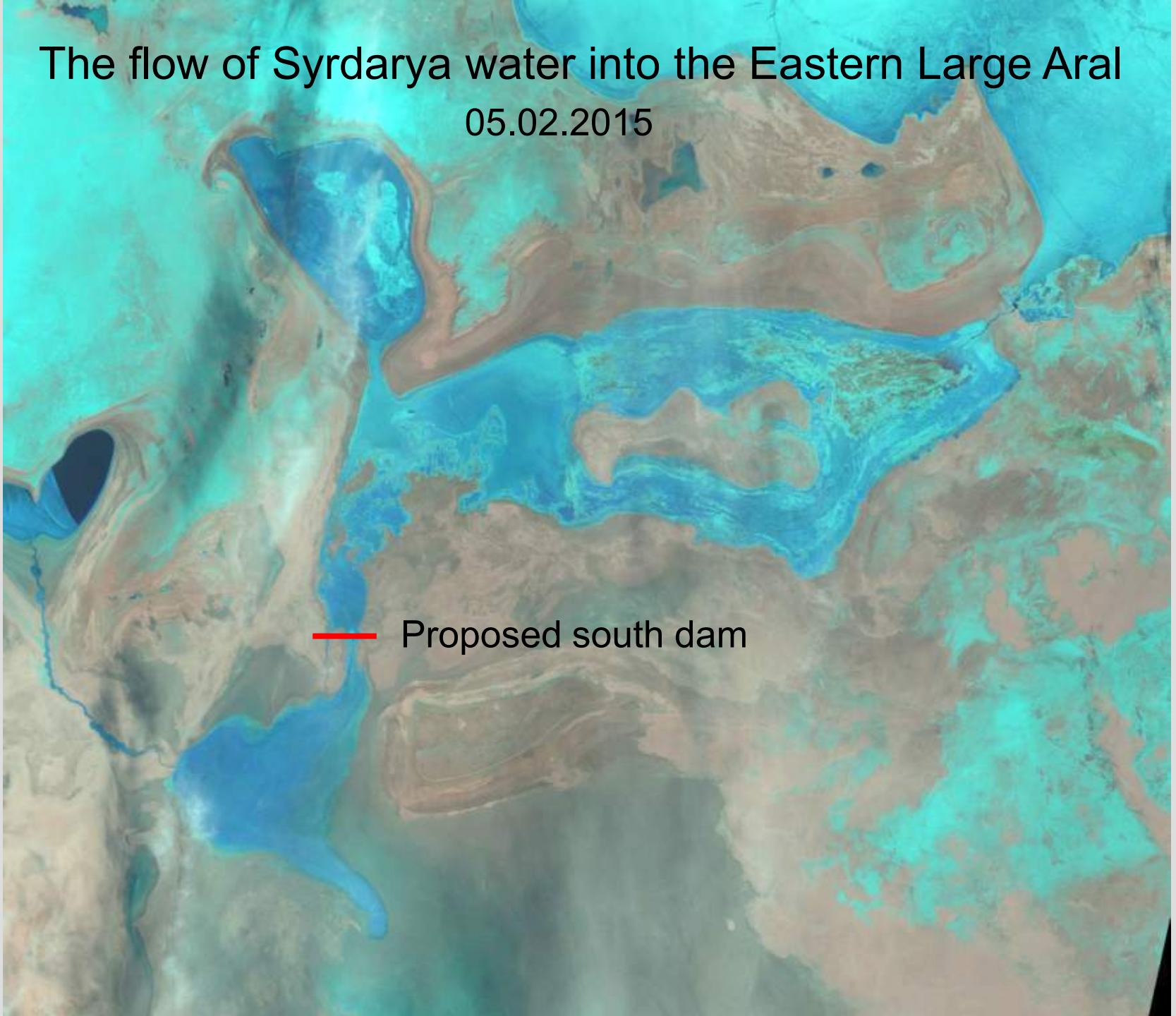
4 - Small Aral

5 - Tshche-Bas Bay

A - Kokaral dam (central dam)

B - proposed northern dam

C - proposed south dam


The flow of Syrdarya water into the Eastern Large Aral
05.02.2015
Proposed south dam

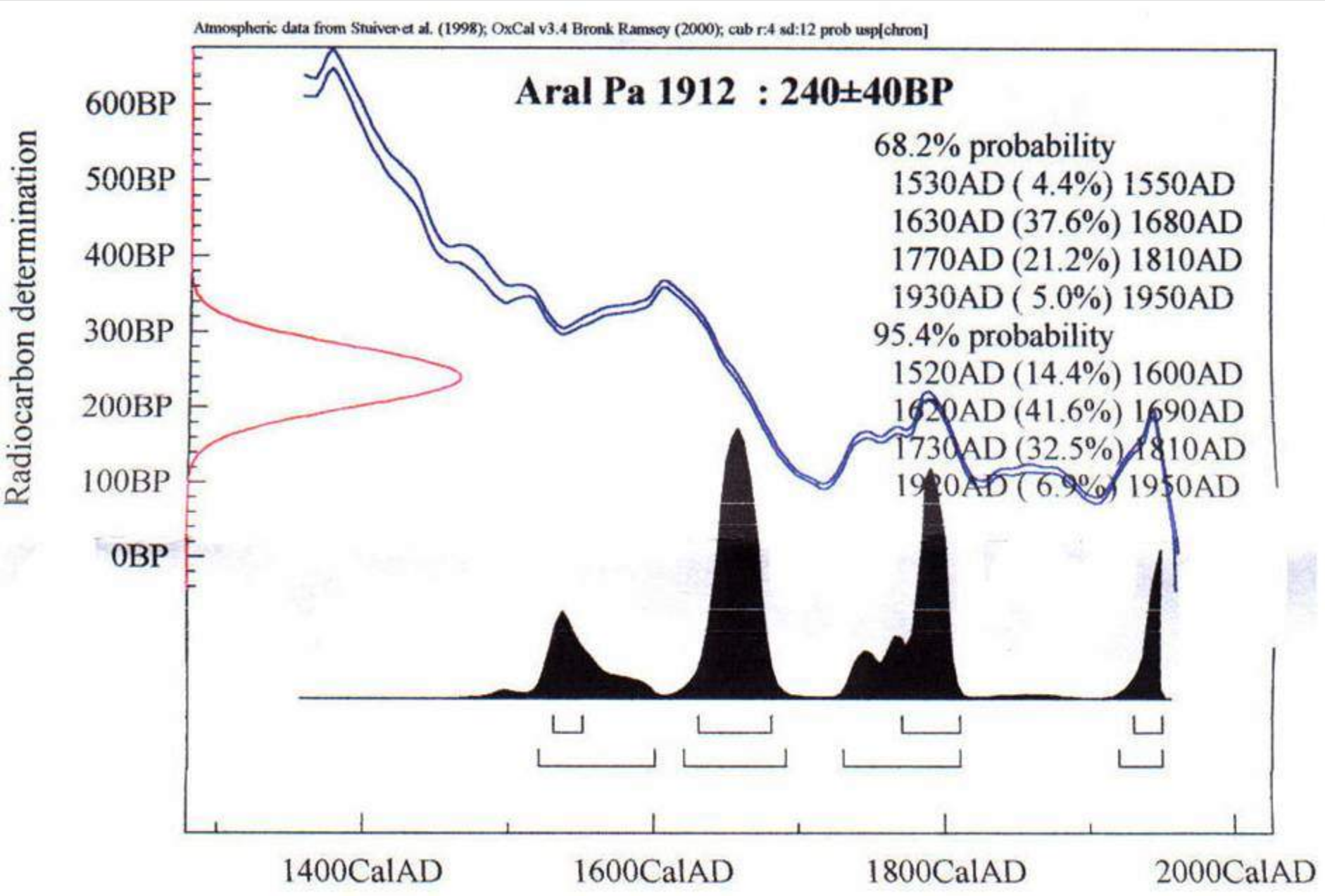
Water from the Small Aral is discharged along with fish

Fish that passed through the Kokaral dam

- The Laboratory of Brackish Water Hydrobiology, established at our institute 35 years ago, continued the tradition of studying the Aral Sea, begun within the walls of ZIN in the middle of the 19th century.
- As already mentioned, Academician L. S. Berg made a special contribution to the study of the Aral Sea. His 1908 monograph on this lake is still relevant today. The team of our laboratory managed to confirm L. S. Berg's prediction that the Aral Sea has repeatedly changed its shape in the course of its history.
- During our expeditions, special paleolimnological studies were carried out, which showed the validity of the views of L. S. Berg.

Medieval saxaul stumps found on the dry bottom of the Aral Sea.

Remains of a medieval saxaul underwater



Radiocarbon dating of saxaul stumps

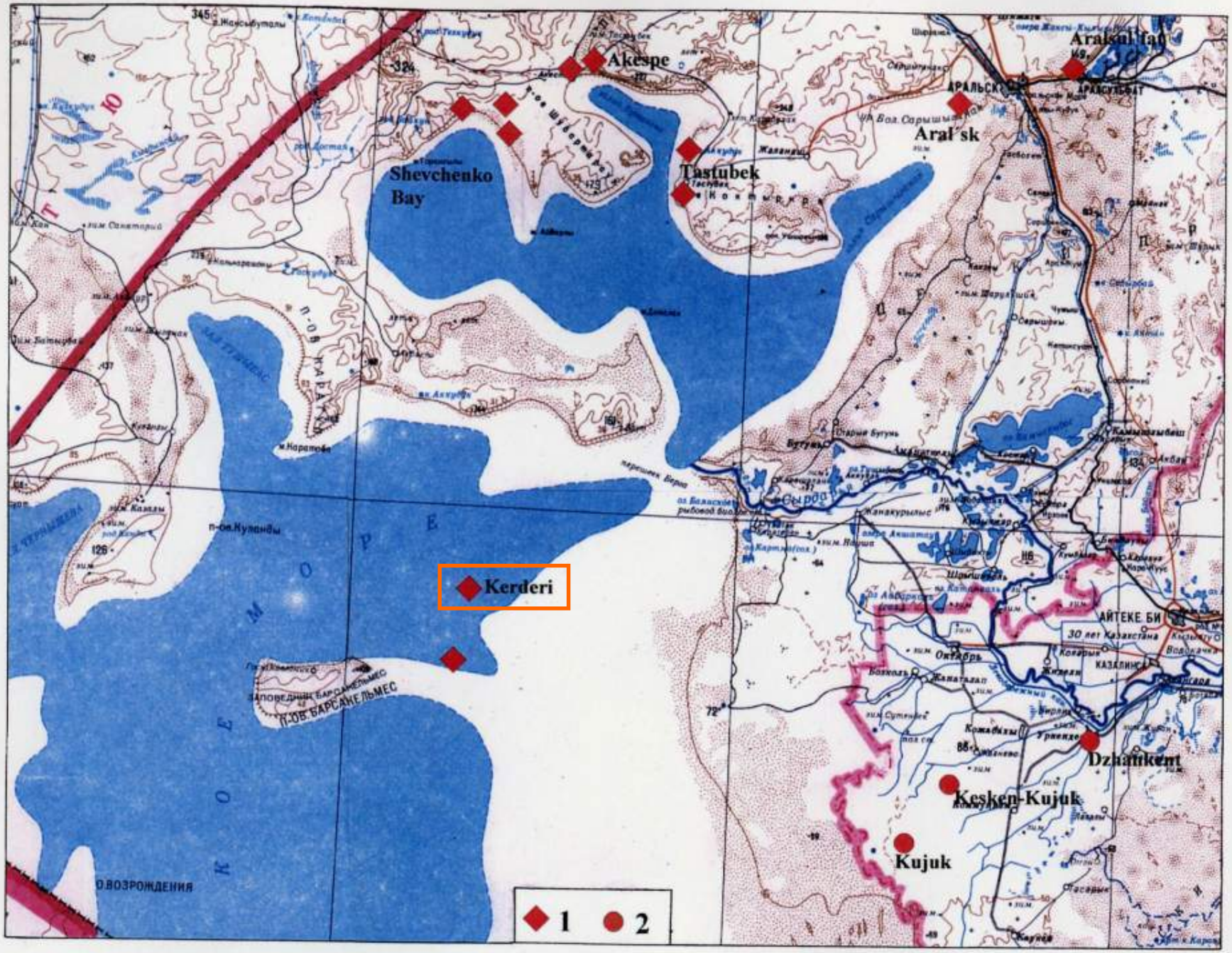
Drilling in the Aral Sea. August-September 2002

Cutting a plastic pipe with a column of bottom sediments

Cutting the core with a metal plate and dividing it into two halves

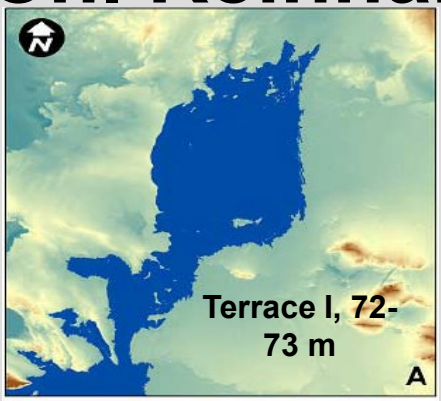
Cutting cores

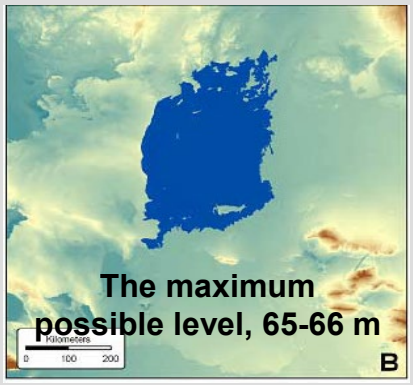
Location of the mausoleum of Kerderi

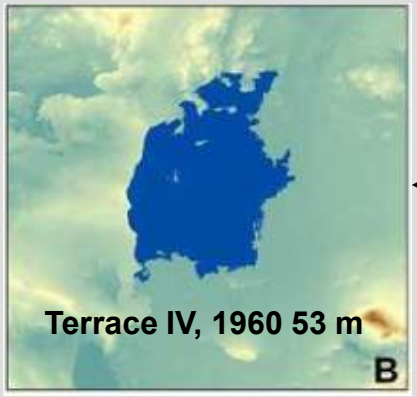


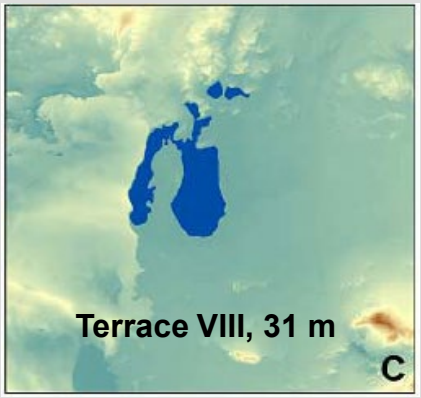
The ruins of a medieval mausoleum found on the dried bottom of the Aral Sea.

Aral Sea at different levels
According to: Ch. Reinhardt, 2006, 2007









Changing the outlines of the Aral Sea

Middle Ages

Mid 19th century

Beginning of the 21st

Paleolimnological data allow us to hope that the ways of conservation and rehabilitation of the Aral Sea discussed today will bring its revival closer in the 22nd century.

- The Aral-88 expedition was organized by the Novy Mir and Pamir magazines. Its participants included writers, publicists, journalists, and scientists of various fields: hydrologists, doctors, geographers, agricultural specialists, biologists, philosophers, economists, and lawyers. A joint ecological expedition of writers and scientists was conducted for the first time.
- The expedition set itself the task of investigating the causes of the death of the Aral Sea and naming those responsible for the ecological catastrophe that had occurred.
- The participants of this expedition published its results in the Novy Mir magazine (No. 5, 1989).
- The expedition was accompanied by a film crew from the Ekran association of Central Television, which shot a full-length documentary film, Diagnosis.
- The highest state bodies of the USSR maintained contact with this expedition, preparing a set of measures to overcome the ecological crisis in the Aral Sea.

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НОВЫЙ МИР

5

1989

ПУБЛИЦИСТИКА

АРАЛЬСКАЯ КАТАСТРОФА

Экспедицию «Арал-88» организовали журналы «Новый мир» и «Памир». В состав ее участников вошли писатели, публицисты, журналисты, ученые разных направлений: гидрологи, медики, географы, специалисты по сельскому хозяйству, биологи, философы, экономисты, юристы. Совместная экологическая экспедиция писателей и ученых проводилась впервые.

Москвичи, ленинградцы и харьковчане высадились в Душанбе в последние дни августа. Здесь к ним присоединились литераторы, журналисты, ученые из Ашхабада, Алма-Аты, Душанбе, Ташкента и Нукуса. Организаторам экспедиции помощь оказали ассоциация «Экология и мир» Советского комитета защиты мира, Госкомприроды, Исследовательский центр Госкомобразования, Рижский автозавод микроавтобусов (РАФ), газета «Воздушный транспорт», пилоты самолетов и вертолетов, члены Академий наук республик Средней Азии и Казахстана, местные партийные и советские органы, люди разных возрастов, привязанностей и взглядов, которым не безразлична судьба Арала.

Экспедиция поставила перед собой задачу: исследовать причины гибели Аральского моря и назвать виновников случившейся экологической катастрофы.

Писатели и ученые встречались и вели беседы с первыми секретарями ЦК компартий Таджикистана, Узбекистана и Туркмении К. М. Махкамовым, Р. Н. Нишановым и С. А. Ниязовым, с первыми секретарями обкомов КПСС, председателями облисполкомов и облагропромов, руководителями водохозяйственных организаций большинства областей республик Средней Азии и Казахстана, с рабочими совхозов, колхозниками, специалистами, учеными, механизаторами, хлопкоробами, виноградарями. Участники экспедиции обследовали опытные сельскохозяйственные станции, гидросооружения и водохранилища, каналы и оросительные сети, знакомились с учебным процессом в школах и вузах, с положением в больницах и детских садах, с жизнью и бытом дехкан, посетив дома более 150 крестьянских семей.

Ниже предлагаем читателям выдержки из отчета и дневниковые записи руководителя экспедиции Г. Резниченко, материалы «круглого стола», проведенного журналами «Новый мир» и «Памир» по результатам экспедиции, а также очерк одного из ее участников — публициста В. Селюнина «Бремя действий».

ГРИГОРИЙ РЕЗНИЧЕНКО

★

«МЫ ЗНАЕМ, ЧТО́ НЫНЕ ЛЕЖИТ НА ВЕСАХ...»

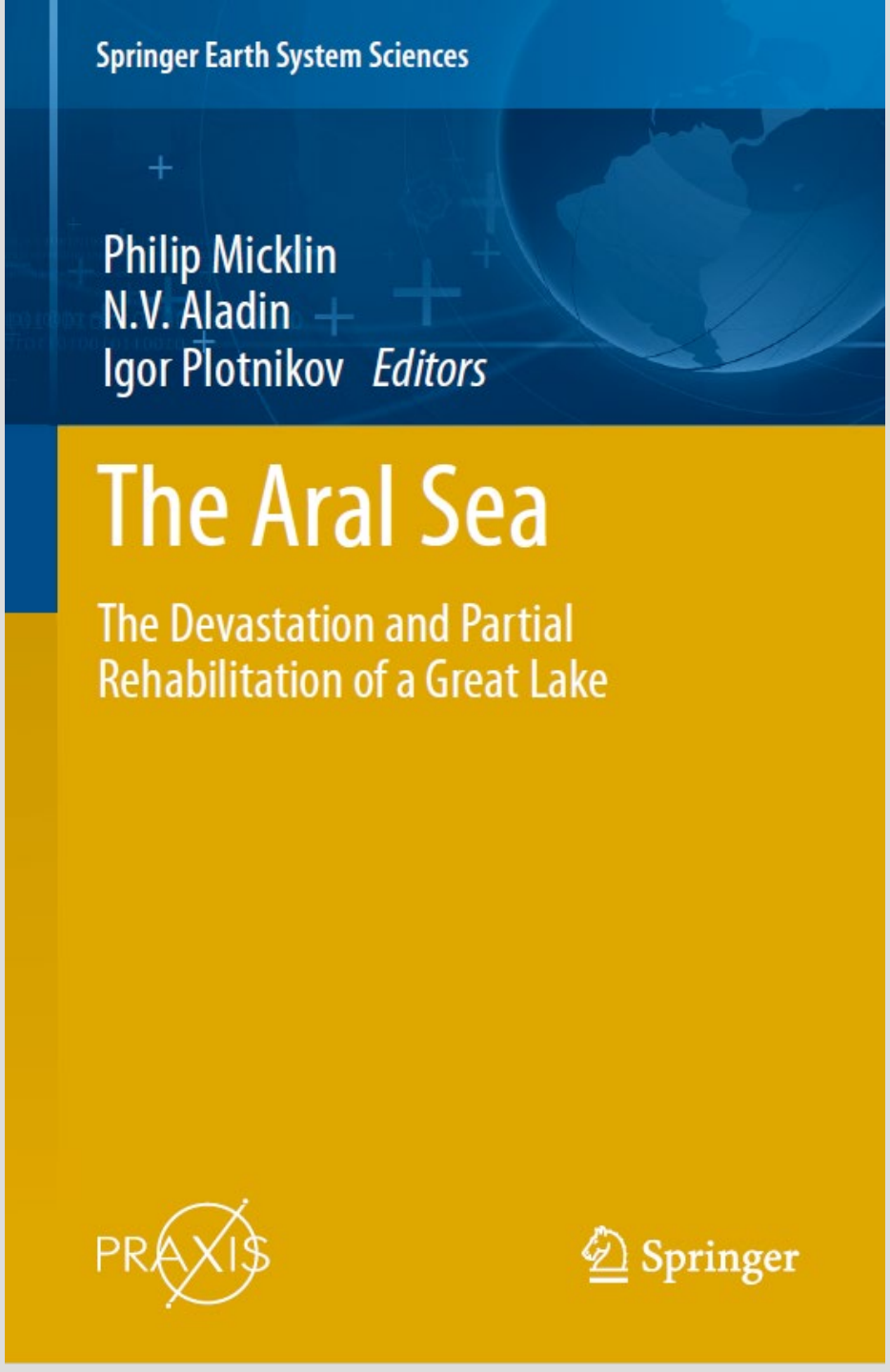
МАРШРУТ

Экспедиция прошла около 13 тысяч километров в бассейне Аральского моря, рек Сырдарьи и Амударьи. Взяв начало в Душанбе, маршрут наш проходил по иссохшим, почерневшим к осени мургабским долинам и перевалам Восточного Памира, киргизским пастбищам и хлопковым полям, по землям древней Ферганы и Ленинабадской области. Пересекли мы освоенные степи Мирзачуля и Джизака — гигантские плантации, где, кроме миллионов хлопковых коробочек да ершистых стеблей хлопчатника, высушенных дефолиацией, ничего не увидишь, ибо ничего другого там нет. Через земли Ташкентской области, полузасушенные богарные холмистые чимкентские поля, через Арнасайские разливы и неупорядоченные водные поймы у Чардаринского водохранилища, через рисовые чеки Кзыл-Орды, минуя Байконур, к концу сентября добралась экспедиция до Арала.

- In 2008, the 20th anniversary of the Aral-88 expedition was celebrated. https://www.caravan.kz/news/segodnya-v-moskve-otmechayut-20letie-nauchnopublicisticheskojj-ehkspedicii-aral88-248722/
- In 2013, there was 25th anniversary of this expedition. https://vodablog.livejournal.com/490498.html
- In 2023, there was 35th anniversary of this expedition. https://ed-glezin.livejournal.com/1871522.html

- August 29 – September 11, 2011 on the Aral Sea worked new international expedition.
- Its members was from Russia, Kazakhstan, Germany, Slovenia, United States, Sweden, Switzerland.
- The main interest of the expedition were biological diversity and biological resources of the Aral Sea.


Остров
«Барсакелмес»
Аралы


Springer Earth System Sciences
Philip Micklin
N.V. Aladin
Igor Plotnikov Editors
The Aral Sea
The Devastation and Partial Rehabilitation of a Great Lake
PRAXIS
Springer

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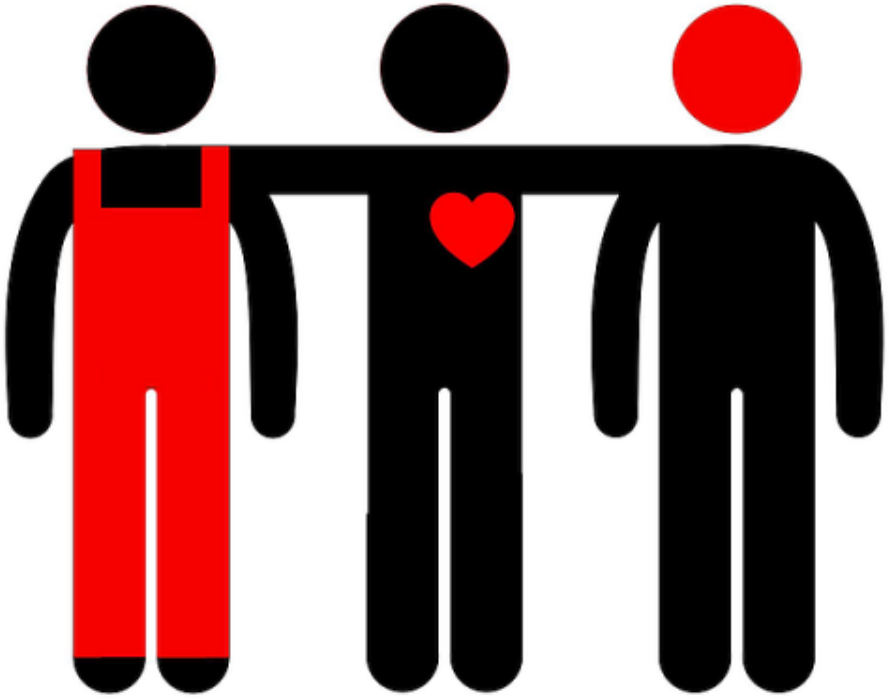
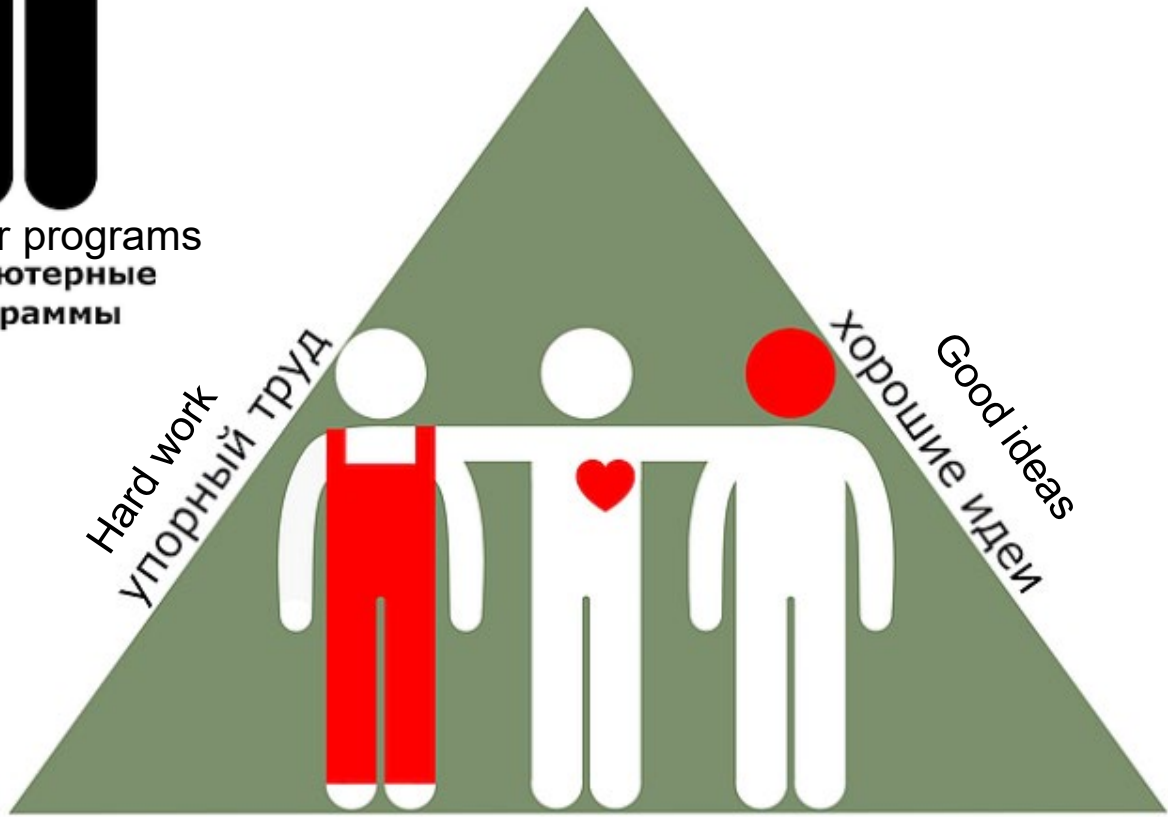
НӘТИЖЕЛЕР, МӘСЕЛЕЛЕР ЖӘНЕ БОЛАШАҒЫ
13–16. 04. 2023
ЗООЛОГИЧЕСКИЕ ИССЛЕДОВАНИЯ В КАЗАХСТАНЕ В XXI ВЕКЕ:
ИТОГИ, ПРОБЛЕМЫ И ПЕРСПЕКТИВЫ
Зоология институтының 90 жылдығы
Юбилей 90 лет Института зоологии

доброе сердце Noble heart



Scientific equipment
научное оборудование

Computer programs
компьютерные программы



доброе сердце Noble heart

August 2005 Docking over the Aral Sea

July 20, 2016 What's left of the Aral Sea

http://www.artemjew.ru/en/2016/07/20/aral16/


Thank you for your attention
the Aral Sea has a future