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Wissenschaftliches **T**auchen an der **U**niversität **S**tuttgart
Scientific Diving Team University Stuttgart

Agenda

1. **Who we are & main fields of research**
2. **Bologna Process**
3. **Scientific Diving** in Europe
4. **Our focus in training**
5. **Conclusion**

Scientific Diving



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One of now 5 Scientific Diving Centres of CMAS:
3 in Europe, 1 in South America & 1 in Africa

- 2 instructors plus approx. 10 to 12 students
 - complete equipment for warm- und cold water dives
 - extensive equipment for documentation and analyses
 - courses from CMAS* up to Scientific Diving Instructor CMAS
- approx. 10 examinations per year



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Shallow Water scientific diving in lakes in Germany, the Mediterranean, the Red Sea and in Asia.

Tauchgruppe

Topics are:

- Description of species new to science
- Invasive species (Neobiota) monitoring
- Ecology of biocoenosis
- Biomaterials
- Plastic litter in aquatic environment



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Some selected publications & outreach in 2020:

Wiegand S, Jogler M, Boedeker C, Pinto D, Vollmers J, Rivas-Marín E, Kohn T, Peeters SH, Heuer A, Rast P, Oberbeckmann S, Bunk B, Jeske O, Meyerdierks A, Storesund JE, Kallscheuer N, Lücker S, Lage OM, Pohl T, Merkel BJ, Hornburger P, Müller R-W, Brümmer F, Labrenz M, Spormann AM, Op den Camp HJM, Overmann J, Amann R, Jetten MSM, Mascher T, Medema MH, Devos DP, Kaster A-K, Øvreås L, Rohde M, Galperin MY, Jogler C. (2020): Cultivation and functional characterization of 79 planctomycetes uncovers their unique biology. **Nat Microbiol.** 5(1):126–140.

Kallscheuer N, Wiegand S, Kohn T, Boedeker C, Jeske O, Rast P, Müller R-W, Brümmer F, Heuer A, Jetten M, Rohde M, Jogler M, Jogler C. (2020): Cultivation-independent analysis of the microbiome associated with the calcareous sponge *Clathrina clathrus* and isolation of *Poriferisphaera corsicensis* gen. nov., sp. nov., belonging to the barely studied class Phycisphaerae in the phylum Planctomycetes. **Frontiers in Microbiology**. doi: 10.3389/fmicb.2020.602250

Kohn T, Wiegand S, Boedeker C, Rast P, Heuer A, Jetten MSM, Schüler M, Becker S, Rohde C, Müller R-W, Brümmer F, Rohde M, Engelhardt H, Jogler M, Jogler C. (2020): *Planctopirus ephydatiae*, a novel Planctomycete isolated from a freshwater sponge. **Systematic and Applied Microbiology** 43(1):126022.



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Scientific Diving in the context of „Bologna“

The **Bologna Process** is a series of ministerial meetings and agreements between European countries to ensure comparability in the standards and quality of higher-education qualifications.

European Higher Education Area

Lisbon Recognition Convention

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CMAS STANDARD FOR SCIENTIFIC DIVER

COMMON PRACTICES FOR RECOGNITION OF EUROPEAN COMPETENCY LEVELS FOR SCIENTIFIC DIVING AT WORK

Both documents are identical, as they were written by the same person, Dr Alain Norro.

There are two different levels in both standard.

- a) The Scientific Diver. CSD / ESD
- b) The Advanced Scientific Diver. CASD / AESD



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Scientific diving training for these standards can be given by either one or a combination of more than one of the following:

- a) a taught course;
- b) a supervised programme of continuous training and assessment carried out in a nationally recognised institution;
- c) diving activities under the auspices of a nationally recognised diving training organisation.



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Scientific Diving
Scientific Diving in Europe Our focus in training

WiTUS in cooperation with the German diving federation developed standards and a series of modules to fit the CMAS/ESDP scientific diving standards into a university curriculum.

There are **5 modules** that have to be completed. The **theoretical** part comprises **3 modules** and the **practical** part **2 modules**.

At the University of Stuttgart we had to combine them into 2 Modules, as we have the rule, that the smallest module has to have 3 credit points. **1 credit point** is a workload of **30 hours**.



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Theory

Module 1: Archaeology / Biology / Geology /

Module 2: Methods in scientific diving

Module 3: Safety

Practice

Module 4: Training for the exam

Examination

Module 5: Final exam

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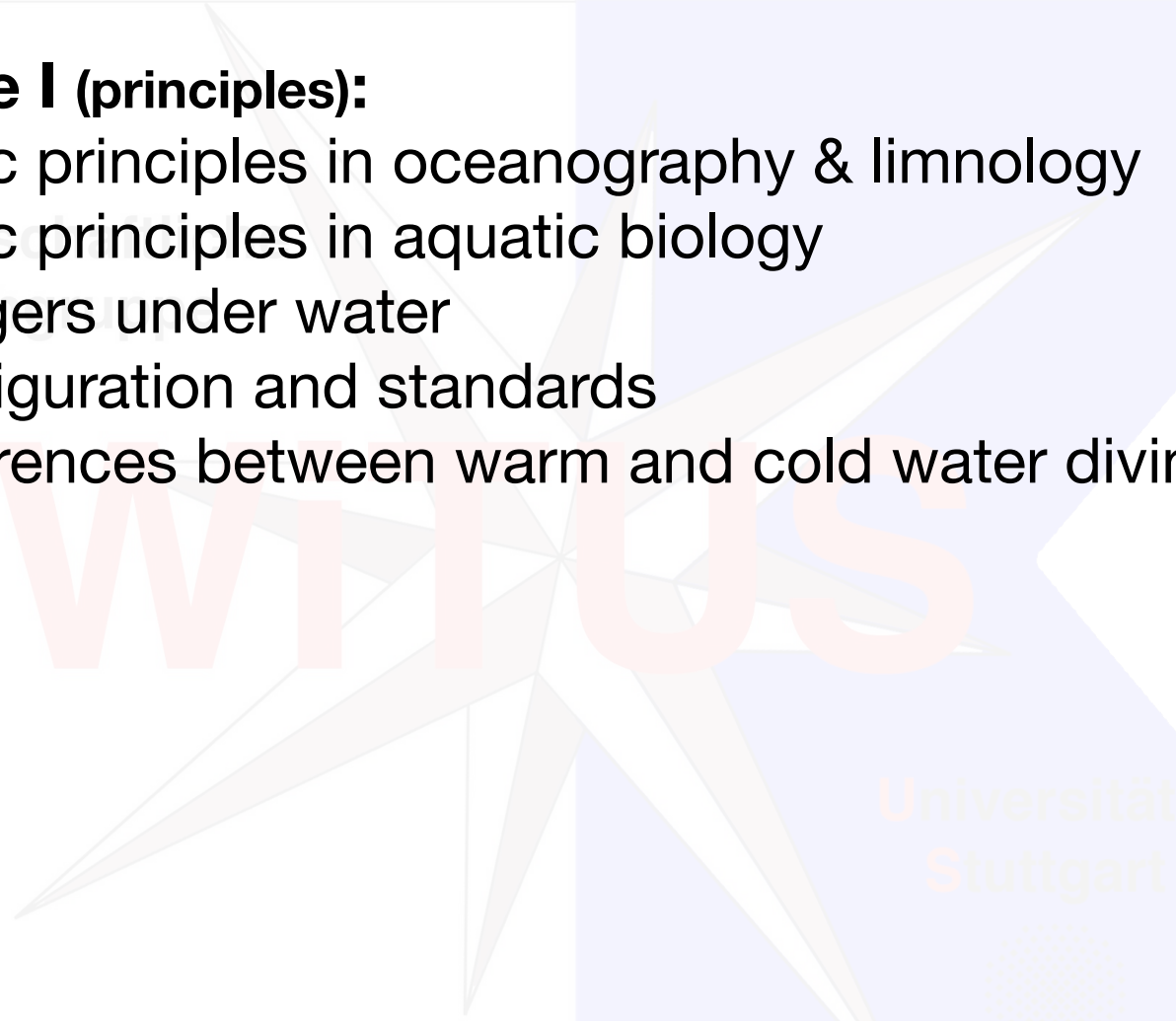


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Module I (principles):

- basic principles in oceanography & limnology
- basic principles in aquatic biology
- dangers under water
- configuration and standards
- differences between warm and cold water diving





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Module II (working under water):

- Underwater transect
 - Mapping frames
 - Chemical parameter
 - Physical parameter
 - Lifting bag/airbags, airlift
 - DOBBs, drilling, sediment sampling
 - Biological samples
 - Transport of samples,
 - Visual documentation
- advantage and disadvantage of digital documentation
- advantage and disadvantage of sketches



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Module III (management):

- Documentation of all parameter above and under water
- Diving protocol
- Planning of the dive, reverse pressure,
- Allocation of tasks for the dive crew
- All needed knots, loading a/the dive vessel, behaviour on board
- Knowing and respecting international legal regulations (CBD, ABS, Nagoya)

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Module IV:

The participants are instructed to transfer their theoretical knowledge into practise.

One major aspect is the planning and execution of a rescue operation.

All examination dives were done as an exercise.

This is the only module without an examination.

The instructors should give advices or corrections.

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Module V:

- Dive 1: **documentation**
- Dive 2: **transects**
- Dive 3: **roped diver techniques**
- Dive 4: **airbags and airlifts**
- Dive 5: **sampling techniques**
- Dive 6: **SCUBA rescue techniques**

In addition :

- Dive 7: **documentation under difficult circumstances**
- Dive 8: **full face mask**
- Dive 9: **scooter**



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Conclusion

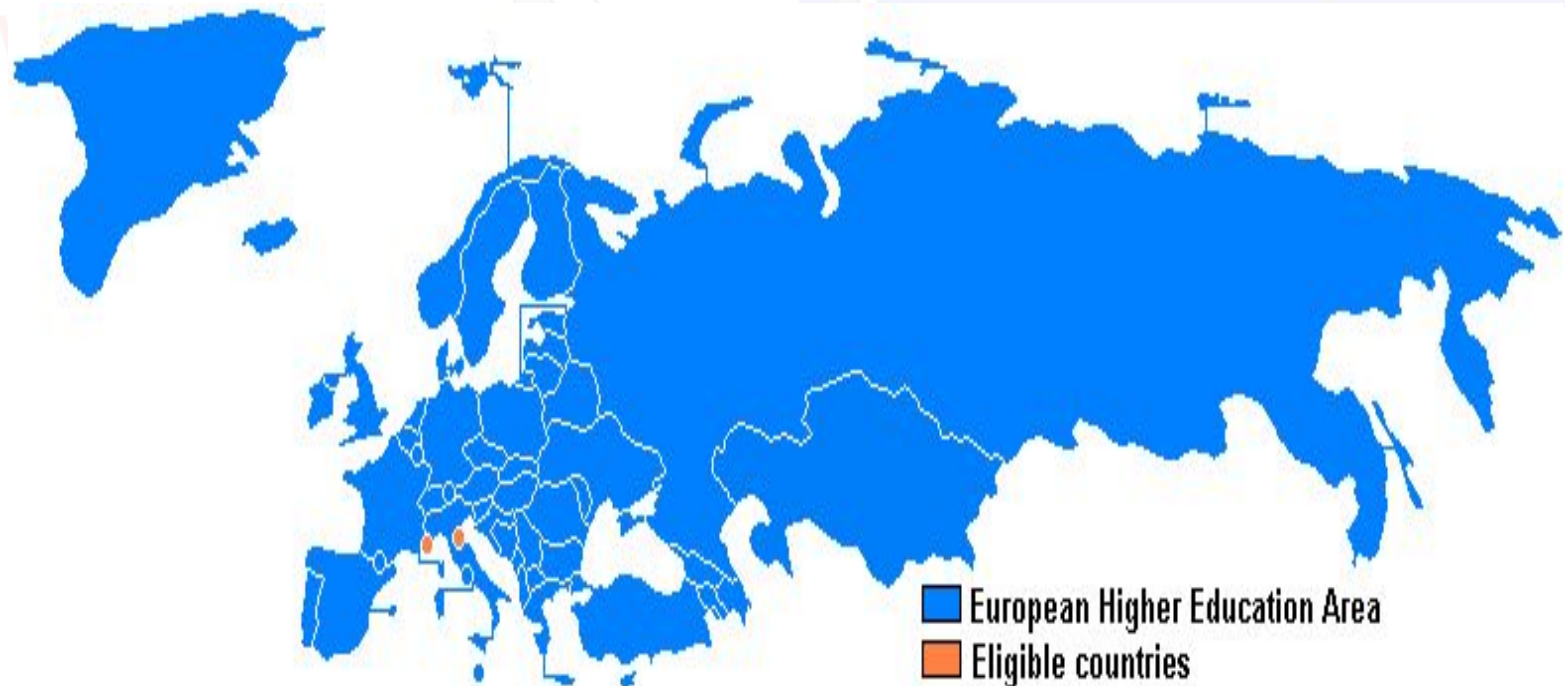
1. There are 2 standards which are identical, but the organisations where they are from don't recognize this.
2. There is a difference between under water professionals working for scientists and scientists working under water.
3. Maybe it would be a solution to adopt a new standard, maybe the one the AAUS uses, or a combination out of all of them.
4. Not the training organization should be decisive, but the qualification for a safe dive.



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Scientific Diving
Bologna Process





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International convention of the Council of Europe elaborated together with the UNESCO

Ratified by all **47 member states of the Council of Europe**, except for **Greece** and **Monaco**

Plus **Australia**, **Belarus**, the **Holy See**, **Israel**, **Kazakhstan**, **Kyrgyzstan**, **Tajikistan** and **New Zealand**

Canada and the **United States** have signed but not ratified

The Convention stipulates that **degrees** and **periods of study** must be recognised, unless *substantial differences* can be proved.