GEO 372
Vertiefung GIScience

Introduction to the lectures and practicals

Herbstsemester

Ross Purves

Who am I?

Ross Purves

English / Deutsch

If you have a question – ask!

Hier in Vorlesungen

Übungen (Mo, 14-16)

25J88

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Meet the team

Katya Egorova	(U)
Peter Jeszenszky	(U)
David Hanimann	(U)
Ross Purves	(A, V, U)
Matteo Riva	(U)
Flurina Wartmann	(V)

A – Administration

V – Vorlesungen

Ü - Übungen

Outline

- Course breakdown
- Course basics
- Assessment – what you need to know
- Lectures – what we will be looking at in the course
- Practicals – getting started and the course themes
- ArcGIS 10 – A 5 minute introduction

What's new

- Approx. breakdown of 5 ECTS (5 x 30 = 150 hours)
  - 12 lectures (12 x 2 = 24 hours)
  - Reading before/ after lectures (15 hours)
  - 6 planned practicals (6 x (2+1) = 18 hours)
  - Project work (45 hours)
  - Poster preparation (3 hours)
  - Report writing (8 hours)
  - Exam preparation (35 hours)

N.B. Groups of two

Module GEO 372

- GEO 372 = Lectures **and** practicals

- **Lectures:** Aim to look in more detail at spatial data and its exploitation from a **GIScience perspective**
- **Practicals:** Illustrate much of the theory through two examples
- The module builds on what you **already know** (i.e. Cartography, GZGI, GEO243) and forms a foundation for **Bachelorarbeit** and **Masters** courses in GIScience

What is GIScience?

- David Mark defined GIScience as follows:

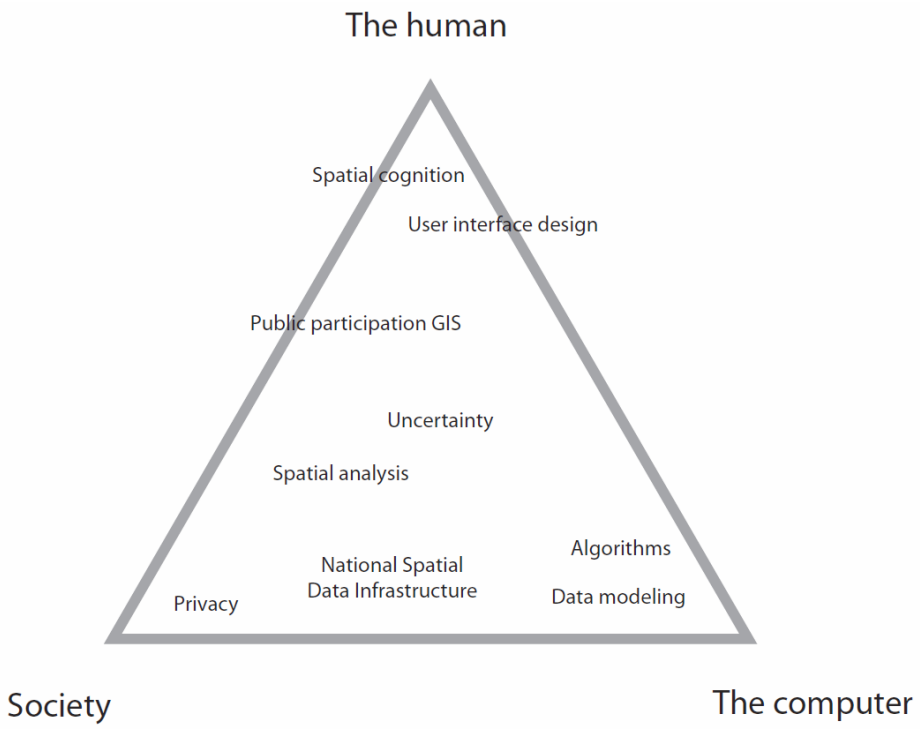
The development and use of theories, methods, technology, and data for understanding geographic processes, relationships, and patterns.

(Mark, 2003)

Mark, D. M. Geographic information science: Defining the field. In *Foundations of Geographic Information Science*,M. Duckham,M. F. Goodchild, andM. F.Worboys, Eds. Taylor and Francis, New York, 2003, pp. 1–18.

Goodchild's vision

- One of the "fathers" of GIScience wrote a review of the discipline entitled *Twenty years of progress: GIScience in 2010* (Goodchild, 2010)
- In it, he presents a conceptual framework for GIScience and some selected themes



In this course we will try to emphasise the ***science*** of GIScience through frequent references to literature

Modulbenotung GEO 372

Aufteilung der Gesamtnote: 50% Modulprüfung / 50% Projektbericht

Übungen

- Die Benotung der Übungen ergibt sich aus der Note für die **Übungsberichte** (Bericht & Poster).
- Kriterien zur Bewertung der Übungsberichte siehe separates Dokument auf der Übungshomepage.
- Die Übungsberichte müssen separat bestanden werden (mit Note ≥ 4.0).
- Ungenügende Übungsberichte (Note < 4.0) können maximal einmal verbessert werden. Die Maximalnote des verbesserten Berichts ist 4.0.

Modulprüfung

- Voraussetzung: erfolgreicher Abschluss der Übungen GEO 372.2.
- Stoffumfang: Gesamter Inhalt des Moduls GEO 372 gemäss Lernzielen der einzelnen Lektionen bzw. Übungen.
- Prüfungsart: Schriftliche Modulprüfung von 1 Stunde Dauer
- Die Modulprüfung muss *separat* bestanden werden (mit Note ≥ 4.0).
- Datum der Modulprüfung: Januar 2017
- Repetitionsprüfung: Vor Anfang Herbstsemester 2017

Lectures

How we will teach…

- Before each lecture
  - We will make **slides available online**
- At the start of each lecture
  - We will give you a **handout** of the Powerpoint slides (??)
  - Say what we covered **last week**
  - Say what you **should know** at the end **(learning objectives)**
- In the lecture we will
  - Try to present **materials with examples**
  - Ask you some **questions**
- At the end of each lecture we will
  - Say what we **have covered**
  - Give you a **reading list** of important papers, textbooks and web sites to deepen your knowledge
  - Hang around to **answer questions**

- **If you want to chat/ read the paper/ write SMS's go to the café**

Key themes of the lectures

- Introduce you to ideas of **data quality** and **uncertainty**
- Show how some **functions** operate in **detail** and look at **examples** of their use
- Explore how we can use **spatial analysis** to solve **complex problems**
- Develop an understanding of how the **results** of a given operation can be **sensitive** to the choice of algorithm and data quality of the inputs
- Introduce the notion of **spatial databases** and explore the use of the **spatial data on the web**
- Talk about **emerging ways** of **producing spatial data**

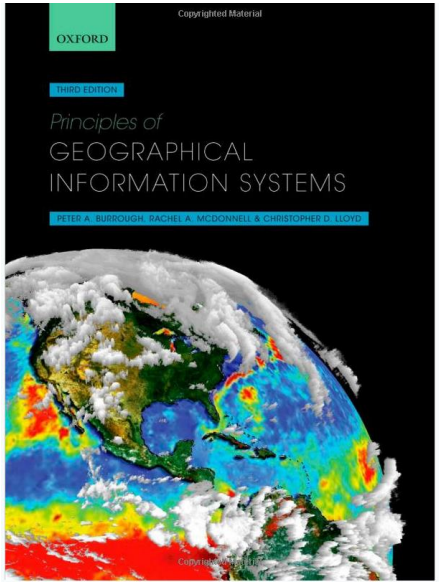
Lecture schedule

19.09. Introduction to the course
26.09. Data quality and data integration
03.10. Spatial interpolation
10.10. Working with terrain models
17.10. Viewshed analysis
24.10. Simple error models for spatial data
31.10. Error propagation in spatial analysis
07.11. Multi-criteria analysis
14.11. Introducing spatial databases
21.11. GIS and the Internet
28.11. Putting people at the heart of GIS (Flurina Wartmann)
05.12. Volunteered geographic information

Handouts and recommended literature

- Printouts given for all lectures (also online after lectures)
- Recommended text

  Burrough et al. (2015): Principles of GIS. Oxford: Oxford University Press.



- We will also use and cite **papers**
- You should use **literature** to help choose the focus of your project work
- **Web of Science** and **Google Scholar** good places to start looking
- Many (most!) journal articles downloadable from inside UZH network (**use VPN**)

Practical information about the practicals

Aims of the practicals

- To allow us to **explore theory** from the lectures in a **practical context**
- To **create** and **manipulate** individual data sets
- To **design and implement** a model to support decision making
- To give you the opportunity to identify a **research focus** and base a report around it
- To give you experience of the **documentation** and **critical evaluation** of scientific work
- To prepare results for presentation to **experts** and **lay people**
- To work with a **complex GIS** that is commonly used in industry

The themes – Modelling tranquility and potential for wind energy in Kanton Bern

- Research area: **Kanton Bern**
- Wide variety of data and data sources available – **you** can supplement these during the practicals
- After the break I'll talk in more detail about the two themes

Practical background

- **Introductory practicals** (6 weeks) should give you tools you need for your project
- **Worksheets** and **introductory films**[1] are available online now for the first six weeks
- Look at these **before logging** in – no film today
- You can **work at your own pace** – aim at the slowest to finish these according to our timetable
- Working faster is no problem
- We can look at your **solutions**, but you don't need to submit anything (except project plan and final report/ poster)

[1] http://www.geo.uzh.ch/microsite/geo372/

Practicals (GEO 372.2)

- 2 shifts, work in groups of **two**
- **Computer lab 25-J-09/10** of GIUZ
- You will **need more than the 2 hours** of the practical per week
- **Unsupervised work possible daily** 08.00 – 19.00, where labs are not in use for teaching:
  - 25-J-8, 25-J-9/10
  - All have identical machines
  - No supervision (but come and ask me if you have big problems)
  - If the door is locked → Come to my office, or ask someone in a nearby office (25-J-88)

Project reports

- The first half of semester we will (more or less) **work together**
- In the second half, you can **choose a focus** and base your **report and poster** on this
- You will find more information about the expected structure of the report on the course web page
- **Important**: We expect a **well referenced, well structured scientific report**, which clearly documents your methodology at the end of the course and a **poster** illustrating the results for lay people

Lab book

- You should keep a **detailed lab book**, as a reference for yourself
- You might choose to do this **online**, or on **paper**
- Your notes should allow you to reconstruct (and repeat if necessary) **everything** you do
- They should also explain **why you** made the choices you did...
- **These notes are for you, not us!!**
- **They are basic good practice in science**

Project plan

- We would like you all to submit a "Plan" for your final project in the practical at the latest on **24.10**
- This Plan should be 1-2 pages showing key working steps through a flow diagram, and explaining your focus
- It is **not assessed** – the idea is to **help you** by discussing your plans

Your jobs before this afternoon

- Practicals start today!!
- **We want to "hit the ground running"**
- **Thus, in the break/ over lunch you should:**
  - Know in which shift you are
  - Have **one partner (no 3er groups please)**
  - **Test your GIUZ Account :**
    - New accounts: Know your username and change your initial password
    - Existing accounts: Make sure you can still log-in(if you have forgotten your password go and see the System Admins in 25-L-12)

ArcGIS 10

Health warning!

In these practicals we will work with **ArcGIS Desktop** from ESRI, but

… the focus is on the **integration** and **implementation** of a complex model with support from a GIS

… we will only use a small proportion of ArcGIS's functionality

… these are **not** ArcGIS practicals – they are **GIS** practicals

… and we are **not** ESRI salespeople!

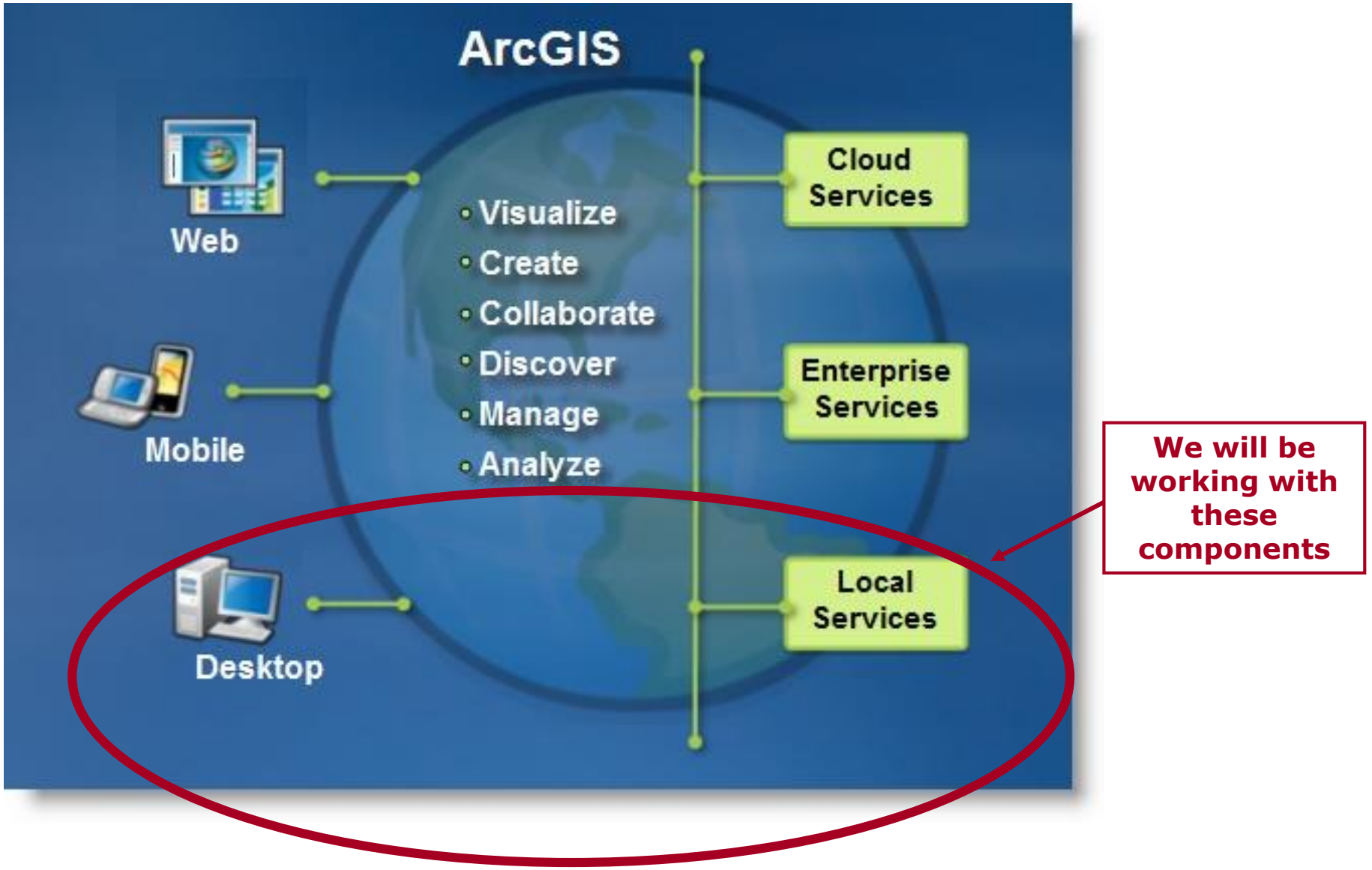
That means: ArcGIS is an example to illustrate theory and the key related concepts

More info on ESRI and ESRI products

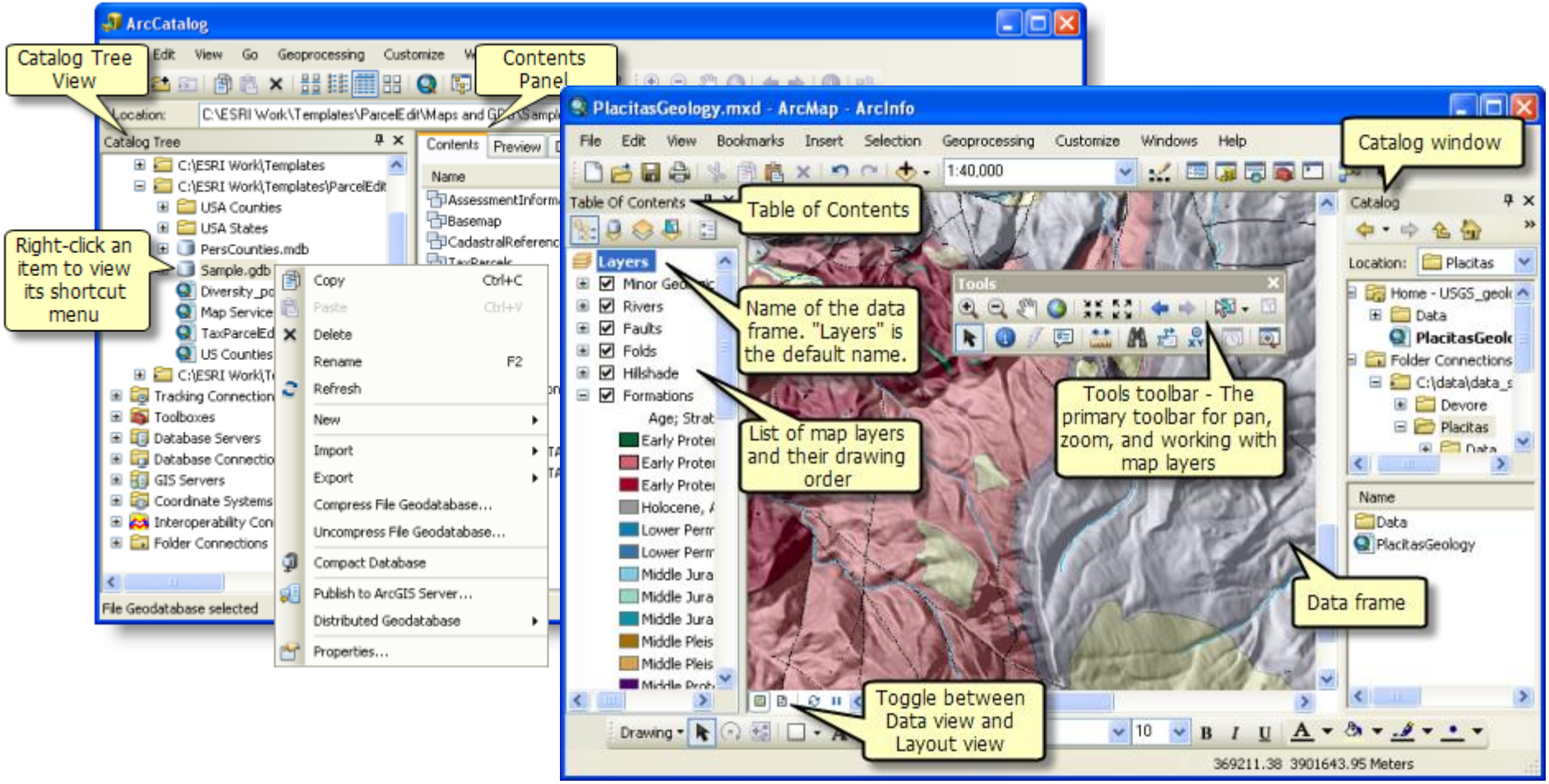
- ESRI Homepage: http://www.esri.com
- Information on software products: http://www.esri.com/products/index.html
- Literature, brochure and presentations: http://www.esri.com/library/index.html
- Support Center (with Knowledge Base for self help): http://support.esri.com/
- More resources: http://resources.arcgis.com/
- ESRI Virtual Campus: http://training.esri.com/gateway/index.cfm
- ArcGIS 10 Web-based Help: http://resources.arcgis.com/en/help/main/10.2/

Source:

→ The following images were sourced from ESRI online and ArcGIS's online help


ArcGIS
Web
Mobile
Desktop
Visualize
Create
Collaborate
Discover
Manage
Analyze
Cloud Services
Enterprise Services
Local Services
We will be working with these components

Main applications: ArcCatalog and ArcMap



These are the two key applications that we will use. ArcCatalog is where we will manage data and metadata. ArcMap is where we can visualise, combine and analyse data.

Summary

- You know the criteria for the module as a whole
- Practicals start this week – make sure your account works, you know your shift and that you have a partner
- Materials designed to let you work at your own pace
- Any other questions – come and ask me (Deutsch oder Englisch)