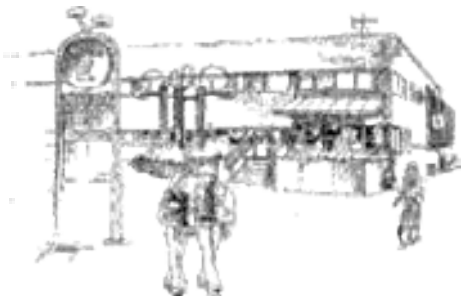


GIS as a Multidisciplinary Bridge in Geography

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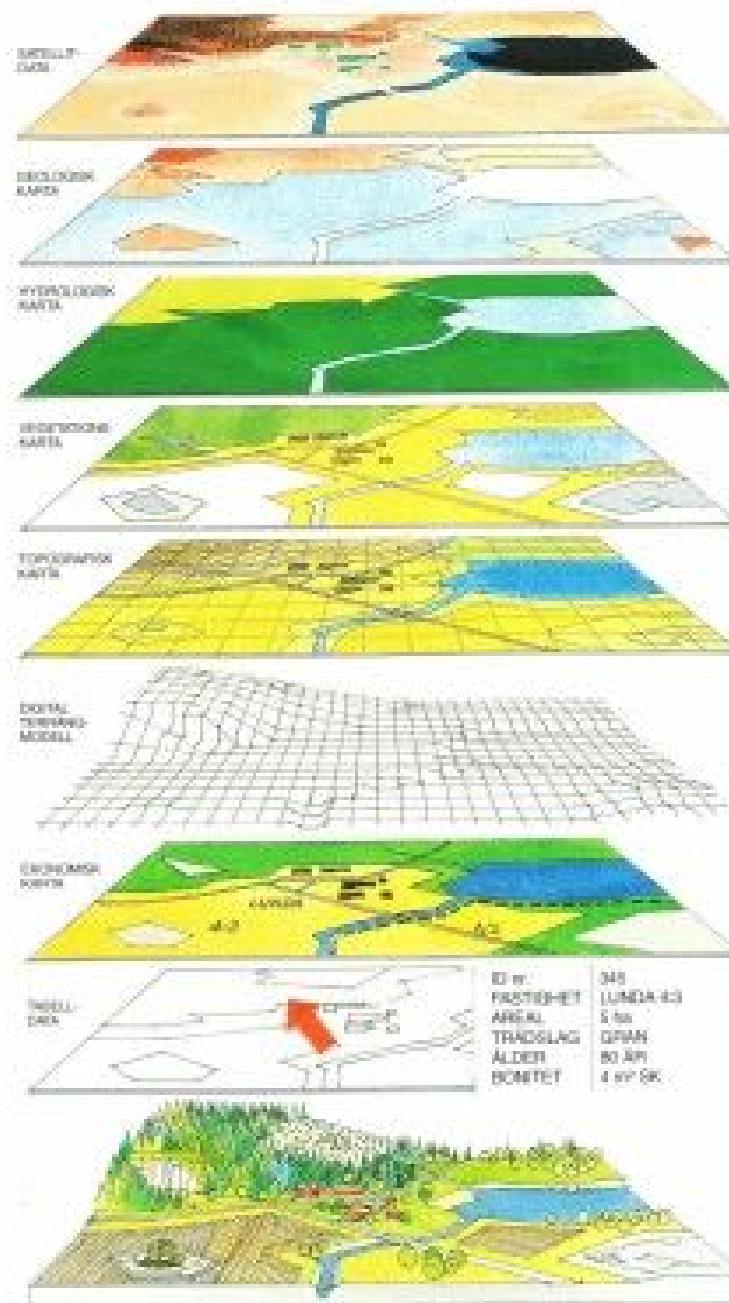
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Geography perhaps not one but many disciplines

- In many countries divided between several traditions and faculties
- Physical Geography, Remote Sensing, Hydrology, Geology etc) and
- Social Science (Human Geography, Social Geography etc) and
- the Humanities (Cultural Geography etc).
- Also Medicine (represented by Health Geography)
- Torsten Hägerstrand was talking about geography as being able to act as "hopfogningskunskap – Gefügekunde - Interfacing





VGS UNIT

GIS as a bridge between the different Geographies but;

- We have different concepts – the ontological problem
- We don't share all methods
- We don't share all perspectives
- We have not been able to demonstrate that we are not only “showing nice pictures”
- But - building models that sometimes introduce new paradigms in the areas that are studied.
 - Crime Stat, Spatial Epidemiology, Spatial Hydrology, Transport planning – but not time – space geography in a convincing way



Geography could provide the spatial aspect of natural, technical, social as well as cultural phenomena

- In numerous applications the geographical perspective contribute to an increasing understanding of such natural phenomena as the circle of water, minerals, nutrients and waste.
- Time and space also define what is waste by identifying the concentration and exposure of substances to populations.
- Storage and transports are other factors helping us to level demand and surplus and giving life opportunities.
- Technical systems and installations are often based on natural resources and concentrate, channel and reshape them into forms that are useful to us.
- As often too much and sometimes also too little of a substance or other things is harmful to us.



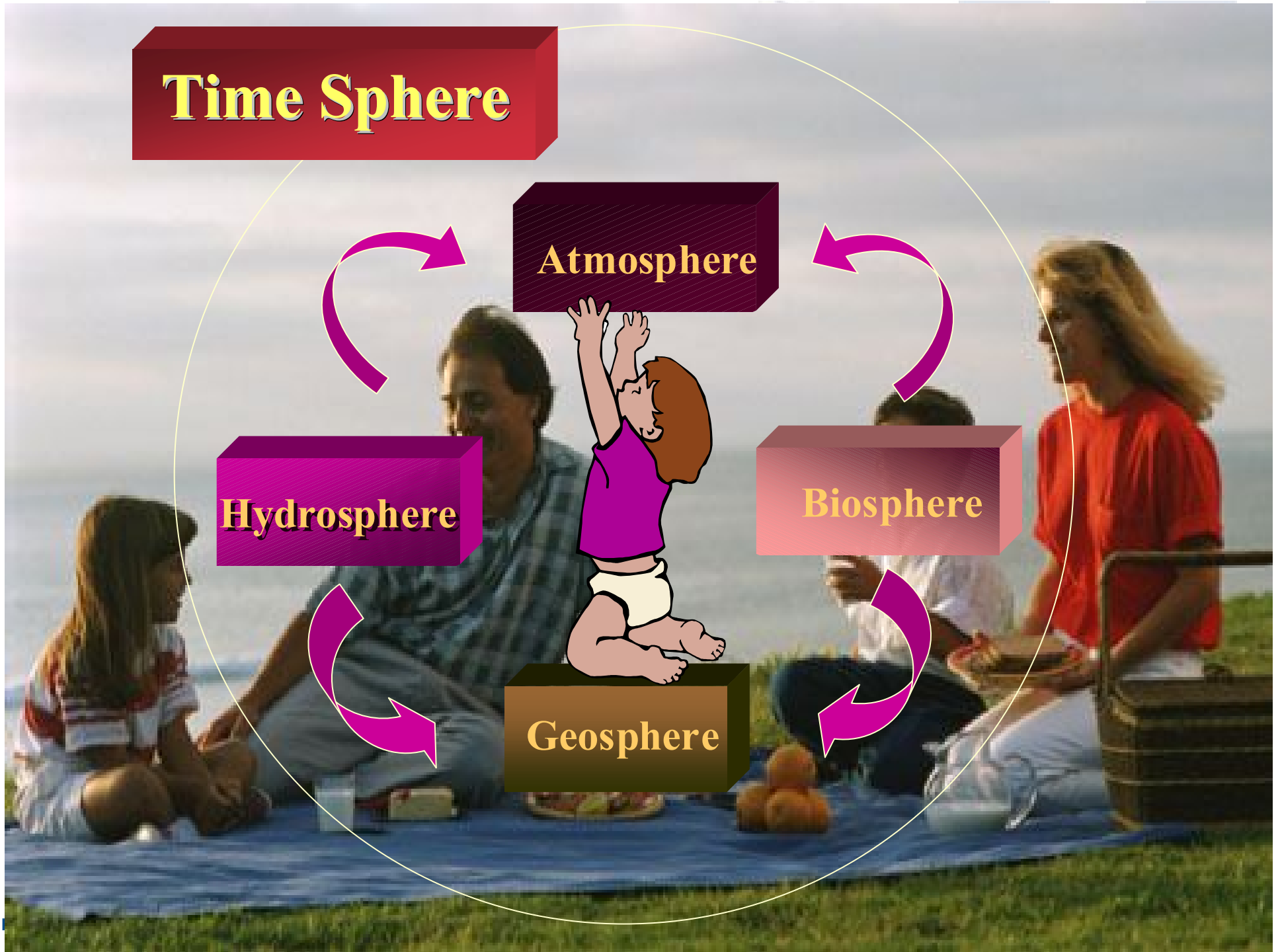
Time Sphere

Atmosphere

Hydrosphere

Biosphere

Geosphere



- **We must be kept in distance to power lines, roads and radioactive substances etc but reasonable close to hospitals and other services to reach important health care in time.**
- **The possibility to combine geographically indexed information and spatial models is obvious in Geographical Information technology and Geographical Information Systems.**
- **By the possibility to combine several aspects in a geographical time-space we can study the interdependency between man and nature in a way that was very difficult if even possible earlier.**
- **However these possibilities are still employed to a limited degree though the different building pieces for such analyses are almost present.**
- **It needs a coordination between all the different disciplines that are working with spatial information. It is not just a question about standardization of the different map or data layers that should be involved in the models but a continuous research about how to use and harmonize the data and information needed and available traditions as geology, biology and sociology.**



Some solutions

- The Knowledge foundation (KKS) is a Swedish research fund with one of the goals of disseminate knowledge especially in Information and other advanced Technologies from the traditional universities to the new established regional university colleges and balance the lack of critical mass in competence by establishing networks between academia and industry as well as the public sector.
- Through funding from KKS a network for Phd students and tutors in Geoinformatics was established 2002. The result was that PhD students active in Geoinformatics jointly could take a research preparation course at Linköpings University. The curriculum was quite general GISc with a problem based (PBL) approach where every student was writing an article related to the own research work.
- Comments were made by peers as well as by the teachers. Exercises were provided over an Internet based tuition tool that allowed exchange of experiences and texts but no chat. Lectures were held every second week with start at 10:00 and ending 15:00 making it possible to travel to and from the lecture occasion – for most students during the day. The students were active in a wide range of projects concerning transports, computer science, geography, geology, archaeology, health, emergency management etc.



- DistanceGIS was originally organized to tackle the problem with disparate competences and interests as distance education for professional (lifelong) education –where we intentionally mixed students from several professional and academic fields as to reach not only skills and understanding in GIS for their own professions but as a bridge between competences. The same idea was tested in the research preparation course however with some more physical lectures and seminars.
- University colleges that were involved were Mälardalens Högskola (Regional University College), Högskolan I Borås, Högskolan i Dalarna, Högskolan I Väst, Kalmar Högskola, Högskolan i Blekinge, Högskolan på Gotland. Further PhD students at Linköpings University were active in the courses and network. Often, the only common interest between the students was the spatial aspect of their work. The network also provided supervision in areas where only few experts are available in Sweden like spatial databases and spatial query languages, spatial ontologies, mobile GIS, cognition in maps, HealthGIS etc.



Distance GIS® Distance learning in GIS - Overview.

Block	Week	Contents Course com- pendium	Geographic Information Systems	Exercises ArcGIS	Use Arc GIS	Your re- port
1	1-2	Introduction	Preface and Chap. . 1, 2	Appendix 1 and 2	Chap. 1 and 2	
2	3	Maps	Chap.. 4	Create background maps for your own project and edit. (Exercises 2 a-c)	Chap. 3, Chap. 6, Chap. 7 pages 125 -137, Chap..	Draft0
3	4	Databases	Chap. 3 and 8	Adapt tables Exer- cise. 3a)	Chap. 4, Chap. 11 and 12	
4	5-6	Vector GIS	Chap. 4 and 7	Create and edit a Shape theme (Exercise. 4 a)	Chap. 14 pages 216-220, Chap. 16 pages 239-243, Chap.. 18 pages 266-285	
5	7	Raster GIS	Chap. 4, 7 and 8	Working with raster data (Exercises. 5a-b)	Chap. 20	Draft1
6	8-9	Data capture	Chap.. 6	Adding features Importing tabular data. Locating addresses (Exercises. 6 a-d)	Chap.4 pages 62- 70 Chap. 5 pages 73- 92 Chap.17 Chap. 18 pages 259-266	
8	10	Analysis	Chap. 9	Selection and analy- sis (Exercises. 7 a-b)	Chap. 13 pages 201-213 Chap. 15 Chap. 16	Draft2
	11-12	Presentation	Chap. 10	Hot links, Handling statistics, Layout (Exercises. 8 a-c)	Chap. 6 pages 106, Chap. 7 pages 138-139 Chap. 8, Chap. 10	
9	13	Introducing GIS in an or- ganisation	Chap. 5, 11, 12, 13 and 14			Draft3
10	14-15	Examination	Chap. 12, 13, 14			Report



Concepts in Distance GIS®

- Lexical knowledge of terms – through individual answers to online “exam” questions
- Knowledge in concepts through group answers
- Practical training in GIS software and functions
- A written report about application in your own geographical area and area of interest
- Peer to peer support and critique during the process
- See the distance as an advantage – a reason for more co-operation through ICT (Information and Communication Technologies)



- **The idea not only to teach and train but foster a new Geography related profession aware of the different spatial disciplinary and professional perspectives**
- **Using GIS as a platform for this**



Distance GIS[®] for teachers TeachersGIS[®]

- Problem Based Learning of GIS in Secondary Schools
- A special “flavour” of our Distance GIS course is Lärar GIS (Teachers GIS). Secondary education (grade 10-12) is divided in different programs like Social Science, Natural Science, Technology etc.
- Geography is included in most curriculum and in the curriculum is GIS and Remote Sensing (RS) two important aspects of the subject. Our teachers have used this opportunity to develop courses where teachers in technology, math, physics, geography, history, social science, business administration etc are developing courses where the different aspects of their subjects are demonstrated in the use of GIS.
- Environmental protection projects together with the local government – with inventory of species as well as protective sites and historical heritage have been popular. In social science and business administration the students have been investigating their local environment as to improve safety, diversity and services like school bus services etc. By using Remote Sensing (RS) data it is possible to discuss the mathematical and physics aspects that are involved in a nice and for the students interesting ways.
- By cooperation with the local government it is possible to get access to detailed geographical data bases as the government get paid back by inventory of risky road crossings, biological diversity or local GIS supported web pages for promotion of tourism, establishing of new businesses etc.
- By using our concept the secondary school students are trained in use of computers in the same way as they are trained in Geographical and GIS approaches to their mayor subjects.



What differs from traditional studies

- Peer to Peer education – students help each other
- Basic knowledge tests through out the course – sometimes with a traditional summary test at the end
- Problem Based Learning – Project oriented
- Working in groups of 5-9 students
- More flexible in time and place but several scheduled lectures
- Less physical attendance by the teachers but
- High awareness and mental presence

