Climate data processing for climate resilience

Tajikistan and Kyrgyzstan

Data access, processing and methodological concepts

Webinar
17. - 27. 11.2020

On behalf of the GIZ- project:
Technology based adaptation to climate change in rural areas of Tajikistan and Kyrgyzstan

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House rules and options :

- **Mute your microphone**
- **Select your Language**
- **You can use Chat function to ask questions and give comments**
- **Rise your hand when you would like to speak**
- **Take care of COVID-19 concepts!**

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Objectives :

- Introduction to sustainable development
- General overview to scenarios of change concepts,
- General overview on Climate Change related Geodata,
- Future projections of Climate Change in the countries
- Model chain from global climate change to local impact for different sectors
- Options for monitoring of Climate developments and impact,
- Databases for disaster risk reduction and disaster control,
- Climate service information systems to generate climate information on demand.

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Week 1 :

DAY	Topic	Objectives	Data & Software	Hands On
Tu. 17.11	Getting Started	Introduction, Expectations	Virtual Machine Unix Useful Utilities	Getting started with Linux exploring the VM
We. 18.11	Policy Frames	SDG Concepts, Climate Action Frames, Ministeries and Institutions	usage of online documents	Country strategies Which data are needed? Which climate infos are needed
Th. 19.11	Scenarios of Change	Shared socioeconomic Pathways (SSP) Future projections of Climate Change Data for Sustainable Development	CMIP6 CORDEX Python notebook	netCDF handling Plotting in Python
Fr. 20.11	Data Families	Which data for which application Reliable climate information netCDF data format Access to Data Archives	ESGF Python client	Access to ESGF

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Week 2 :

DAY	Topic	Objectives	Data & Software	Hands On
Mo. 23.11	The Big Data Problem	Importance of Interoperability How to design a Data-center	birdy-client	Design a Data Center for Central Asia Big Data Handling Server-Side data processing
Tu 24.11	Satellite Images	EO and Climate Change	Sat-Data in QGIS & SNAP	Water Detection ??
We. 25.11	Disaster Risk Reduction		Sat-Data in QGIS & SNAP	Flood Mapping ?? Desertification ??
Th 26.11	Climate Signals	Concept of climate indices Multi-model and Uncertainties	Python with xclim	calculation of future CC Signals
Fr. 27.11	FAIR Climate Service	Climate Services Information Systems	Brainstroming about the Design a Data Center(s)	Optional presentation of participants course projects

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Introduction to each other

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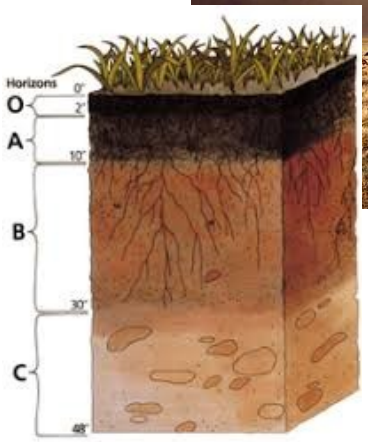
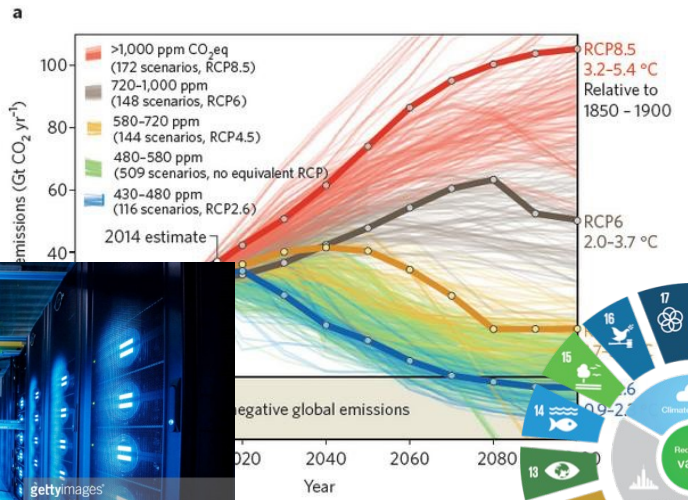
Dr. Nils Hempelmann

Johannes Gutenberg University Mainz 2007-2010	Doctor of natural sciences Department of Geography Grade: very good
Philippes University Marburg 2000-2006	Diplom Department of Geography Grade: good (1.5)





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The Participants:

https://docs.google.com/document/d/1i6hvZ483M2oa7yzRaM1H0dEKQDGq4OvKRijjySISF7o/edit#heading=h.tyjcwt

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Very little introduction to the world of UNIX

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Shells

(Terminal / Console)

- Thompson-Shell osh
- Bourne-Shell sh
- C-Shell **csh**
- Job-Control-Shell jsh
- Korn Shell **ksh**
- Public-Domain-Korn-Shell pdksh
- Bourne-Again-Shell **bash**
- TENEX-C-Shell tcsh
- Z-Shell zsh
- Almquist-Shell ash
- Debian-Almquist-Shell dash
- ….

Useful commands:

```
#!/bin/bash
echo $0
echo $SHELL
echo $PATH

#to change the shell just type the name
bash
csh

who
date
cd
mkdir
pwd
ls -al
history

man ls


exit
```


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Wildcards

Wildcards allow to have access to more then one file with one command.
They are substitutes for none, one or more character.

*	for none or more character
?	for exactly one character
[n-m]	for exactly one character out of n-m,
[n,m]	for exactly two characters n and m,
^	negation
{text1,text2,..}	strings separated by commas

All kinds of combinations are possible.

Useful commands:

```
rm *.txt
cp car? $HOME
rm [d,e]
more file?
more file*
ls -l ^file*
```


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local Variables

Variables contain informations.

We distinguish between **predefined** shell variables (system variables) and **user defined** variables.

local variables, only callable during the process they are created in.

Useful commands:

```
#!/bin/bash
variable=value
variable="va lue"

#!/bin/csh
set variable = value
set variable = "va lue"

# create empty variables
set variable

# delet varables
unset variable1 variable2

# list of all defined variables
set

# call the content
$variable
```


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Calculation (in bash)

Operator	Meaning
VAR++ and VAR--	variable post-increment and post-decrement
++VAR and --VAR	variable pre-increment and pre-decrement
- and +	unary minus and plus
! and ~	logical and bitwise negation
**	exponentiation
*, / and %	multiplication, division, remainder
+ and -	addition, subtraction
<< and >>	left and right bitwise shifts
<=, >=, < and >	comparison operators
== and !=	equality and inequality
&	bitwise AND
^	bitwise exclusive OR
|	bitwise OR
&&	logical AND
||	logical OR
expr ? expr : expr	conditional evaluation
=, *=, /=, %=, +=, -=, <<=, >>=, &=, ^= and |=	assignments
,	separator between expressions

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UNIX Tutorial for Beginners:
http://www.ee.surrey.ac.uk/Teaching/Unix/index.html

The first UNIX Manual ever:
http://cm.bell-labs.com/cm/cs/who/dmr/1stEdman.html

UNIX Guide for Beginners:
http://sillydog.org/unix/

Introduction to UNIX commands:
http://kb.iu.edu/data/afsk.html and much more….

Books:
The Wait Group: UNIX Primer Plus (SAMS)-english
Jerry Peek & all: UNIX Power Tools (O-Reilly)- english

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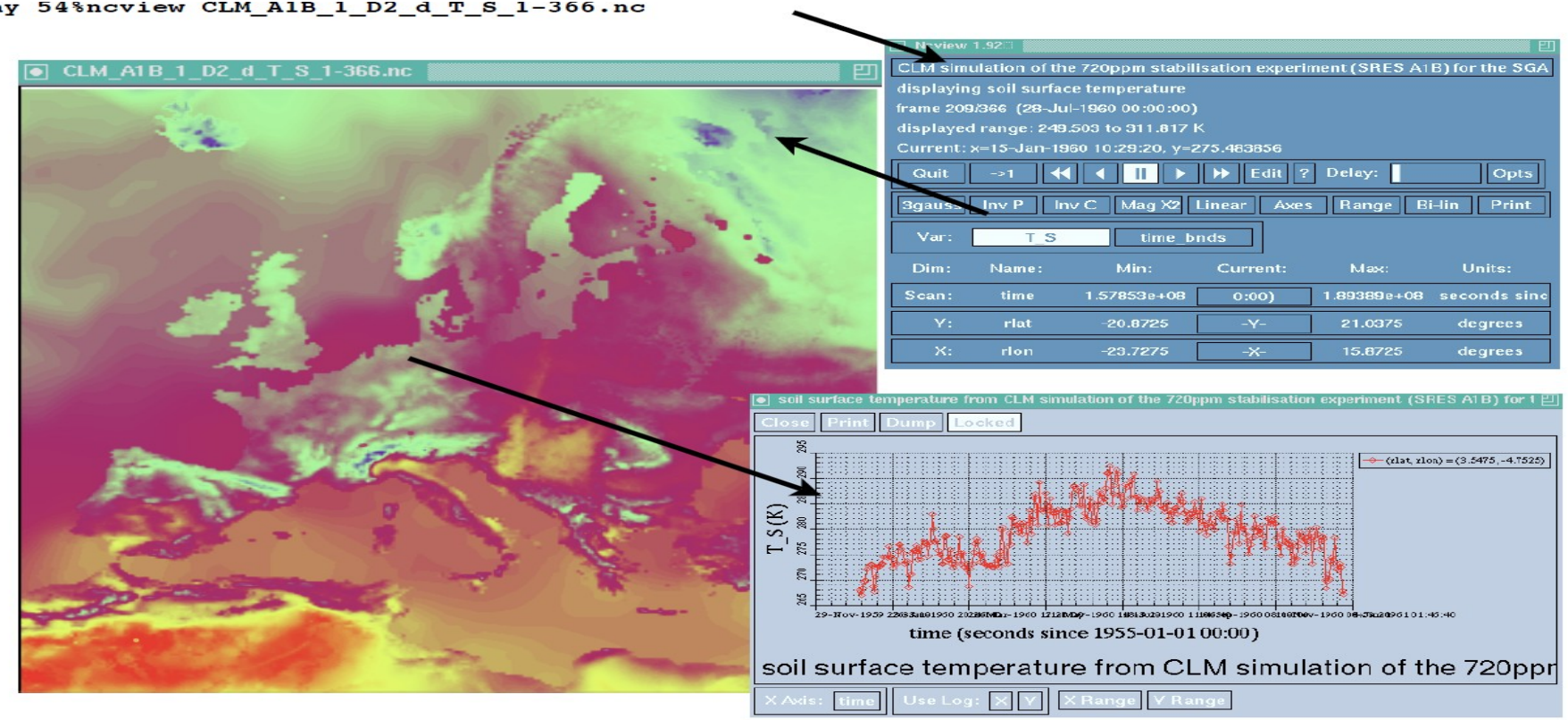
ncview

```
tiny 54%ncview CLM_A1B_1_D2_d_T_S_1-366.nc
```



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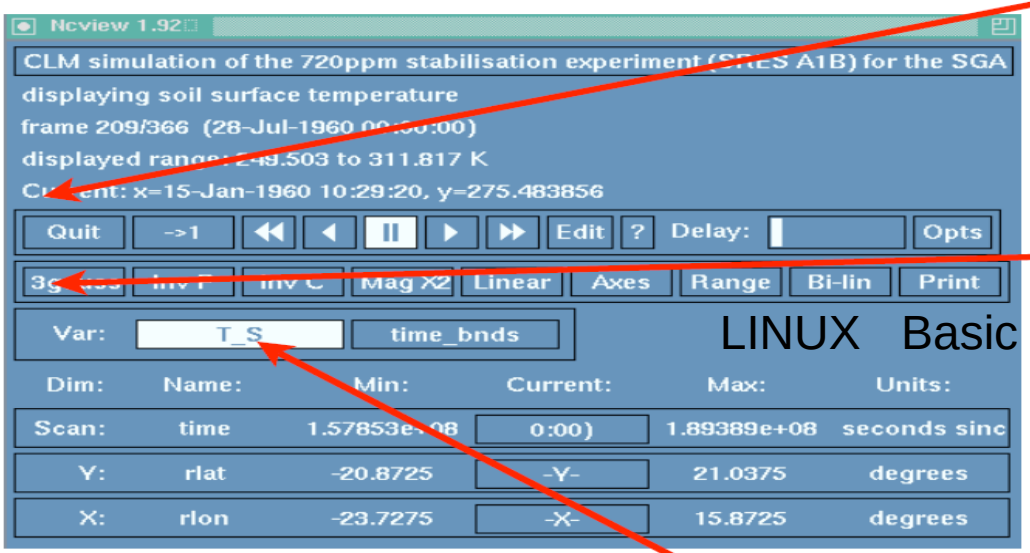
ncview



LINUX Basic commands

first row:

1:quit ncview
2:back to the first screen
3 a-e:move through the data
4:edit data
5:infos about the variable
6:delay between two screens
7:contour map overlay!

second row:

08:color tables
09:invert plot (turn upside down)
10:invert colors
11:magnify plot(increase:left, decrease right mouse button click)
12:kind of color filter (hi empha-sizes high, low low values, linear = off)
13:change axes
14:set data range (klick with the right mouse button gives the best range of colors for the plot)
15:bilinear interpolation or replicate pixels
16:print plot to postscriptfile

third row:

choose variable

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Get Started

Launch the Virtual Machine

- Set keyboard and language settings
- Explore folders and files
- Open a terminal
- Open a climate data file with panoply

https://docs.google.com/document/d/1i6hvZ483M2oa7yzRaM1H0dEKQDGq4OvKRijjySISF7o/edit#heading=h.3dy6vkm

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