



Dynamic

Motivation and goals



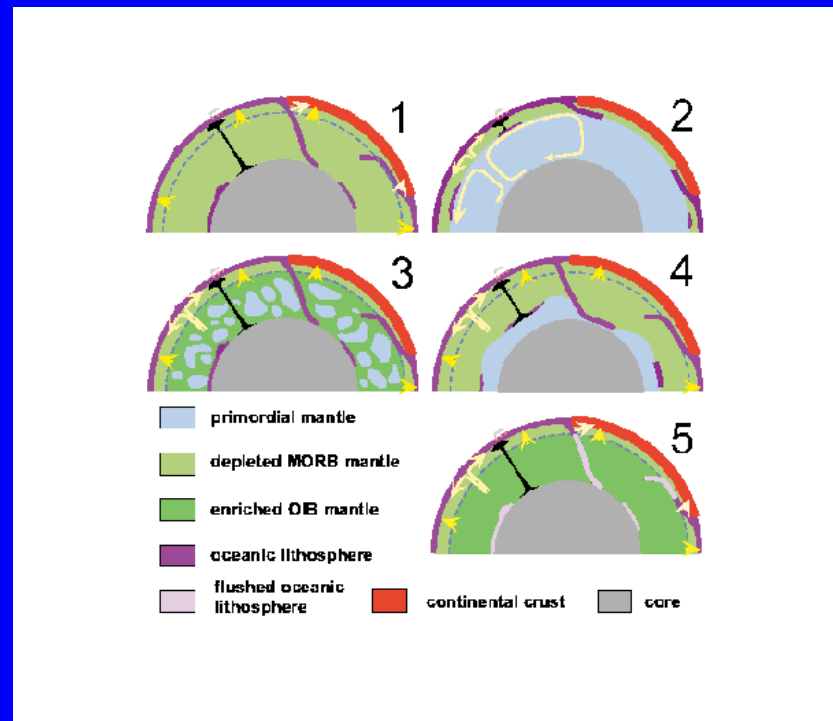
- Inter-disciplinary Synthesis Center
- Research Incubator
- Integrative framework

- To tackle the fundamental question of the nature of global dynamic processes that drive plate tectonics on Earth

- The ultimate goal is to understand the origin, evolution, and dynamics of the Earth and planets.

40 years after the acceptance of plate tectonics, we are still debating:

- the proportion of heat coming from the core versus radiogenic heating in the mantle;
- The degree of chemical mixing across the mantle;
- The origin and even existence of mantle plumes;
- the chemical/thermal nature and origin of heterogeneity in the deepest mantle;
- The nature and importance of coupling between mantle and core;

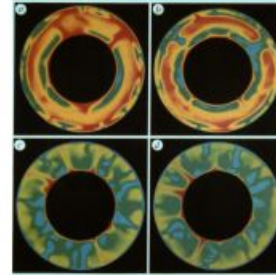


(Albarède and van der Hilst, 1999)

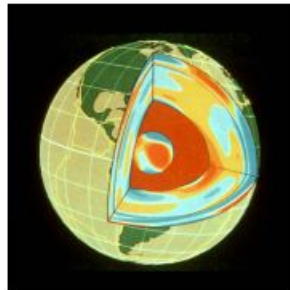
Understanding the Earth's interior requires a synthesis of..



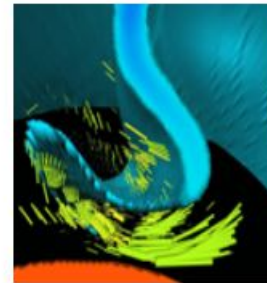
Chemistry and Mineral Physics,



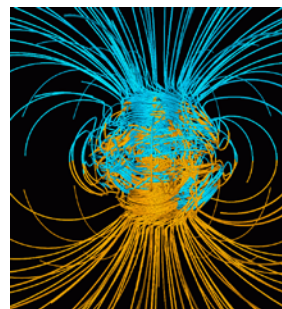
Geodynamics,



Seismology,



Rheology and Material Properties,



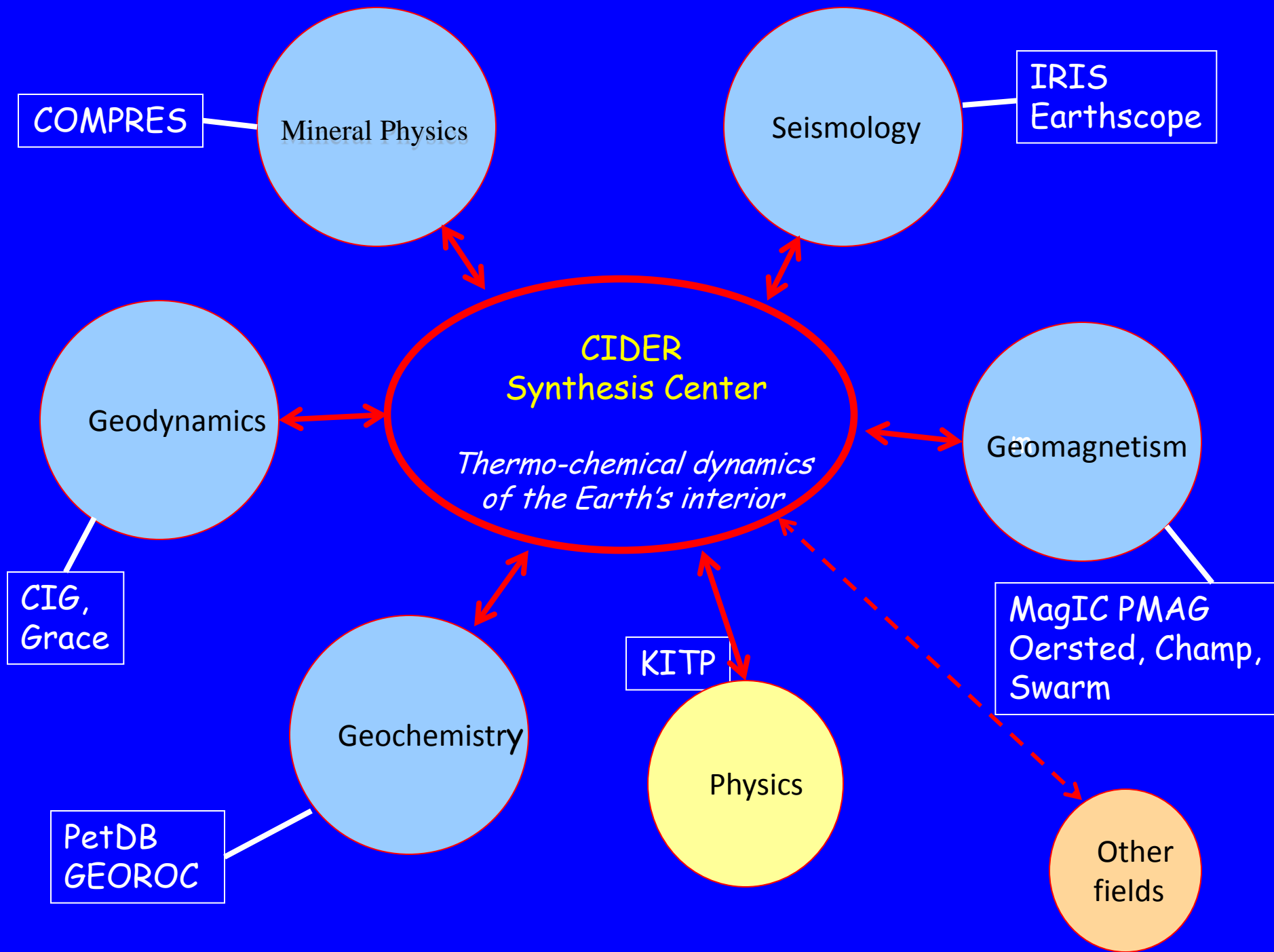
Geomagnetism



Cooperative Institute for
Deep Earth Research

Recognizing the need for more effective communication and understanding between the different disciplines, CIDER's goal is to provide:

- An intellectual framework facilitating integrated multi-disciplinary research in the geosciences.
- The necessary complement to growing infrastructure for data gathering and distribution.
- Across-disciplinary educational environment at all career levels, and in particular to prepare the next generation of earth scientists



CIDER activities so far...

CIDER Community workshop – May 2003, Marconi Center

77 participants from 43 institutions.
Goals: Define the scope and format of CIDER

CIDER Proposal submitted to NSF/CSEDI - 2004

2004 Summer Program: 07/12/04-08/06/04

“Relating seismological and geochemical heterogeneity in the earth’s mantle”

2 weeks tutorial + 2 weeks workshop
30 grad students/post-docs
21 junior/senior scientists

2006 Summer Program : 07/16/06-08/06/06

“The earth’s transition zone”

Overlapping 2 weeks tutorial/2 weeks workshop
35 grad students/postdocs
20 junior/senior scientists

2008 Summer Program: 06/23/08-08/05/08:

“Boundary Layers in the Earth”

3 weeks KITP style (overlap with “Dynamos” + 2 weeks tutorial + 2 weeks workshop (incl. VLAB)
35 graduate students/post-docs
35 junior/senior scientist

All summer programs held at KITP, Kohn Hall, UCSB campus funded by NSF/CSEDI, infrastructure provided by KITP.

What role will CIDER-II play ?

Research Synthesis Center

Research Incubator

Think Tank

Frontier Center

Intellectually stimulating environment

"Master model" for
thermo-chemical
dynamics of the earth's
interior

Foster interdisciplinary collaboration

Effective mechanisms for cross-
disciplinary education

Facilitate integrative research

Proposed CIDER-II activities

- Summer Programs (*3-6 weeks -> held every year*) - expand to include surface and near-surface dynamics
- Develop and support Working groups to address key topics relevant to CIDER goals (provides mechanisms for community evaluation, validation, problem reconciliation, consensus building)
- Facilitate activities of research teams formed during summer programs, to allow full development of new research directions
- Develop and sustain a virtual organization, including the management of debate forums on controversial topics



Cooperative Institute for
Earth Research

Dynamic

CIDER-II Governance

- CIDER National Office, with Director/Associate Director and support staff stipends, held at one institution, on a rotating basis (5 years?).
Supported by:
 - Steering Committee
 - Advisory Committee
- Summer programs: held at KITP or elsewhere
- Budget: ~\$1-1.5 Million/year

Executive Committee



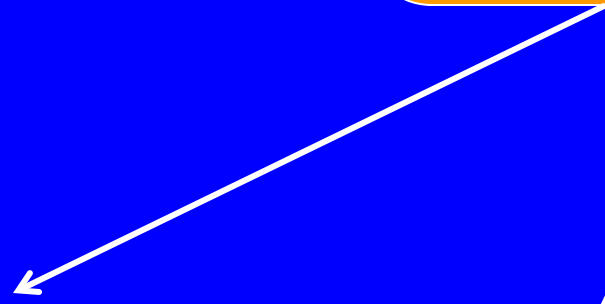
Science Steering Committee



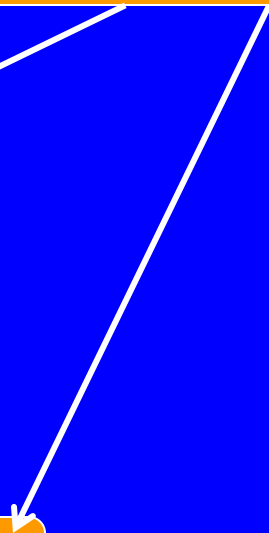
CIDER National Office:

- Director
- Associate Director
- Administrative support
- computer/web support

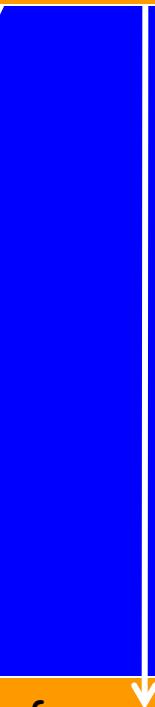
Summer Programs and follow-up projects



Working groups



Debate forums/
virtual framework



CIDER Lectures/Tutorials Instructors:

Thornsten Becker (<i>geodynamics</i>)				2008	USC
Bruce Buffett		2004		2008	UCB
Louise Kellogg		2004	2006	2008	UCD
Carolina Lithgow-Bertelloni		2004	2006		U. Michig.
Michael Manga				2008	UCB
Peter VanKeken,			2006	2008	U. Michig.
Don DePaolo (<i>geochemistry</i>)		2004			UCB
John Eiler			2006		Caltech
Stan Hart	2004	2006	2008	WHOI	
CinTy Lee		2006	2008	Rice U.	
Sujoy Mukhopadhyay			2006	2008	Harvard
Tom Duffy (<i>min. phys.</i>)			2006		Princeton
Mark Hirschmann			2006		U. Minnes.
Abby Kavner	2004			2008	UCLA
Jackie Li				2008	UIUC
Bob Liebermann				2008	SUNY
Lars Stixrude	2004	2006			U. Michig.
Adam Dziewonski (<i>seismology</i>)		2004	2006	2008	Harvard
Alan Levander			2006	2008	Rice U.
Guy Masters		2004	2006	2008	UCSD
Barbara Romanowicz	2004	2006	2008	UCB	
Anne Sheehan			2006		U. Colorado
Jeroen Tromp				2008	Princeton

CIDER participating Institutions (2004-08)

U. Leeds
U. British Columbia
Chinese Academy of Sciences
ENS Lyon
Weitzmann Institute
Oxford U.
Bristol U.
U. Of Utrecht
Moscow IPE
U. Of Trieste
Univ. College London
U. Of Alberta
U. Of Muenschen
U. Of Muenster

Yale
MIT?
Princeton

UC Berkeley
UCLA
UC Davis
UCSD
UC Santa Cruz
U. Of Chicago
UIUC
U. Of Connecticut
Harvard U.
Lamont
WHOI
U. Of Maryland
Louisiana State U.
Rice U.
New Mexico State
SUNY at Stony Brook
ASU
Ohio State
Caltech
U. Of Michigan
CSU Northridge
U. Of Minnesota
U. Of Wisconsin, Madison
USC
St Louis U.
U. Of Washington, St. Louis
Argonne Nat. Labs.

CIDER Products

- Presentations at AGU
- Papers published as a result of CIDER interactions
- Proposals written to CSEDI -some funded !
- Students have gone on to post-doc and faculty positions



2008

2004

Total over 3 summer programs:

*100 grad students/post-docs
54 faculty/scientists incl. 23
instructors*

*38 US institutions
14 foreign institutions*



Summer'2010 CIDER Program:

"Fluids and volatiles in the Earth's mantle and core"

- June 6- July 18th, 2010
- 2 weeks of tutorial program (June 27-July 11), overlapping with workshop (July 4-July 18).
- Theme: "Fluids and volatiles in the Earth's mantle and core"
- Overlaps with KITP program on "The Physics of Glasses"
- Followed by 2010 SEDI Meeting (July 19-24, 2010, Santa Barbara).

CIDER STEERING COMMITTEE 2003-2007

- :
- D. DePaolo UC Berkeley Geochem.
- A. Dziewonski (chair) Harvard Seismology
- S. Hart WHOI/MIT Geochem.
- R. Jeanloz UC Berkeley Mineral Phys.
- L. Kellogg UCD Geodynamics
- D. Kent Rutgers Geomagnetism
- M. Manga UC Berkeley Geodynamics
- G. Masters UCSD Seismology
- P. Olson Johns Hopkins Geodynamics
- B. Romanowicz UC Berkeley Seismology
- L. Stixrude U. Michigan Mineral Phys.
- E. Stolper Caltech Geochem.
- D. Weidner SUNY Mineral Phys.

CIDER STEERING COMMITTEE 2008-

- :
- C. Constable UCSD Geomagnetism
- D. DePaolo UC Berkeley Geochemistry
- T. Duffy Princeton Mineral Phys.
- A. Dziewonski Harvard Seismology
- S. Hart WHOI/MIT Geochem.
- M. Hirschmann U. Minn. Min. Phys/Geoch.
- L. Kellogg (Chair) UCD Geodynamics
- C.T. Lee Rice Geochemistry
- M. Manga UC Berkeley Geodynamics
- G. Masters UCSD Seismology
- B. Romanowicz UC Berkeley Seismology
- L. Stixrude U. Michigan Mineral Phys.