Science for Sustainability

EARTH SYSTEM SCIENCE CENTER

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www.ccst.inpe.br

EARTH SYSTEM SCIENCE CENTER

STRATEGIC GOALS

Development and improvement of earth system models, monitoring networks and socio-political analyzes, aiming at the construction and analysis of scenarios of environmental changes and climate projections.

O CCST CONTRIBUTE:

✓ In drafting the Policy and the National Plan for Climate Change.

✓In the executive coordination of the FAPESP Research Program on Global Climate Change.

✓In the exercise of the Executive Secretariat of the Brazilian Network for Research on Climate Change.

✓In the implementation of skills to generate scenarios of global environmental changes and their effects in the country and in Latin America.

✓In the democratization and dissemination of the science of global climate change, through the diffusion of knowledge to the different public - educational area at all levels, media and public policy makers at the municipal, state and federal levels.

✓In providing scientific and technological subsidies to the government to actively participate in the major forums of international environmental negotiation

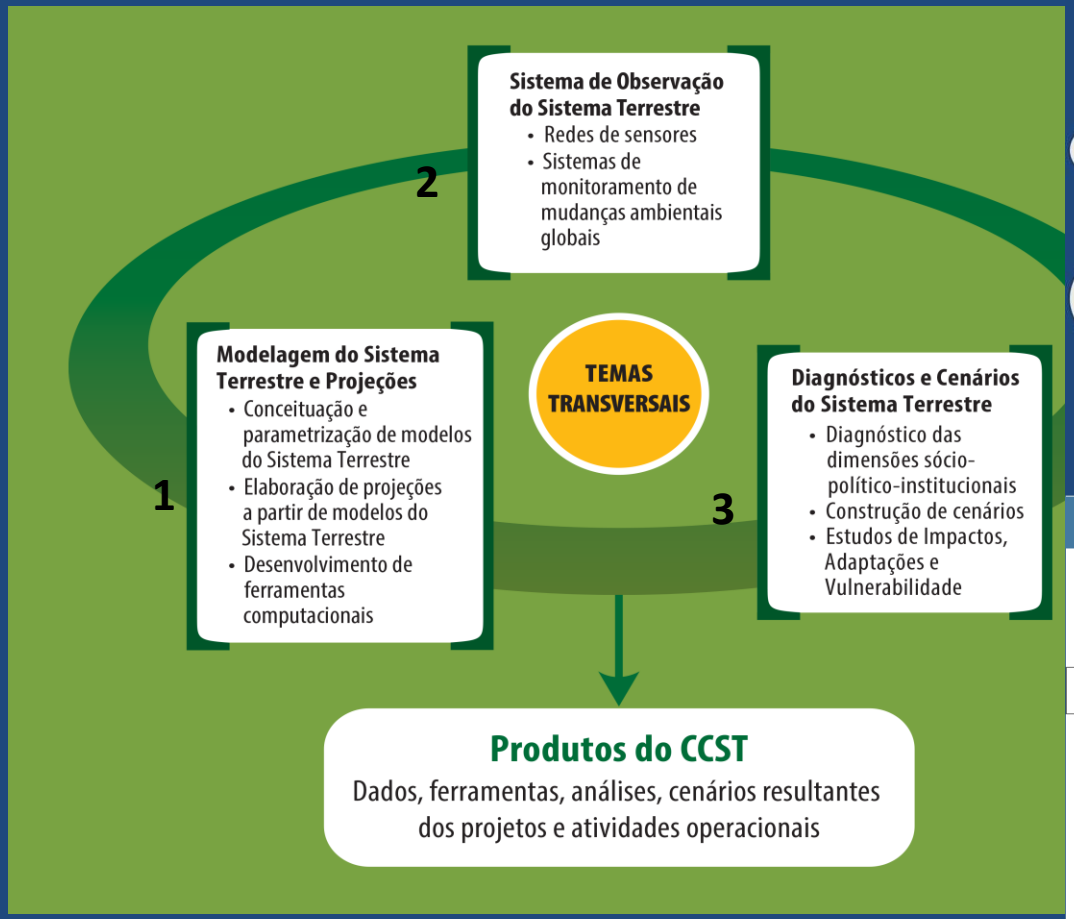
✓Sustainable development aims to reconcile the good functioning of the economic, social and environmental spheres. CCST encompasses skills in these areas and sustainable development is part of the Center's mission.

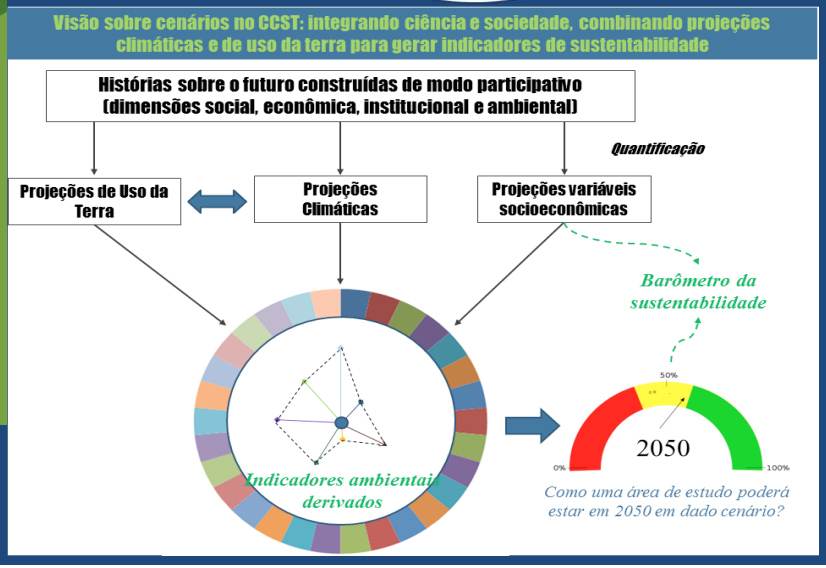
São José dos Campos

Cachoeira Paulista

NEW CONCEPT

CCST organization in integrated components through cross-cutting projects, aiming at the construction of sustainability scenarios for Brazil.





1 – EARTH SYSTEM MODELING

One of the greatest scientific challenges of the CCST/INPE is the ability to represent the Earth System (ST), covering not only the biological and physical dimensions, but also the human dimension. The challenge of studying in an integrated manner those dimensions is something globally, especially in countries embryonic in development.

Among these initiatives are:

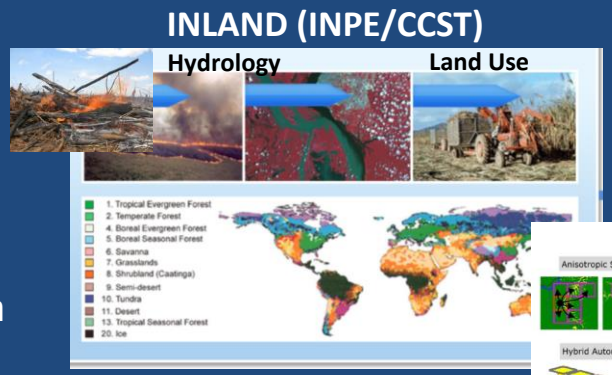
✓the development of INLAND model;

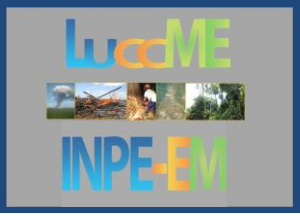
✓environmental modeling platform spatially explicit (EARTH);

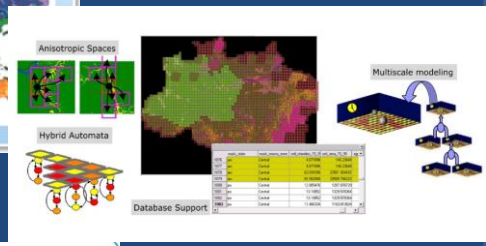
✓the development of models of land use changes (LUCC) and emissions of greenhouse gases (INPE-in);

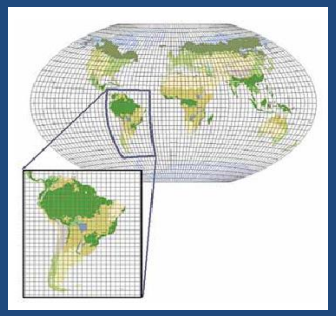
✓the development of models of electrical discharges in the atmosphere, atmospheric radiation and wind potential; hydrological models (MHD-INPE);

✓Agricultural models, as well as regional climate modeling for construction of scenarios and impact of climate change at regional level

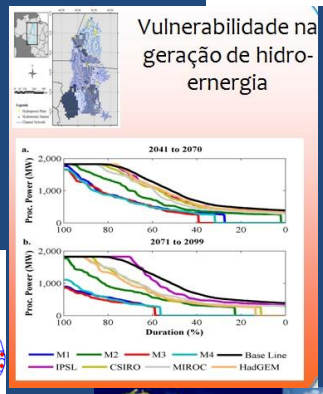


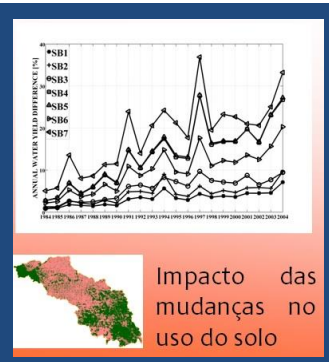




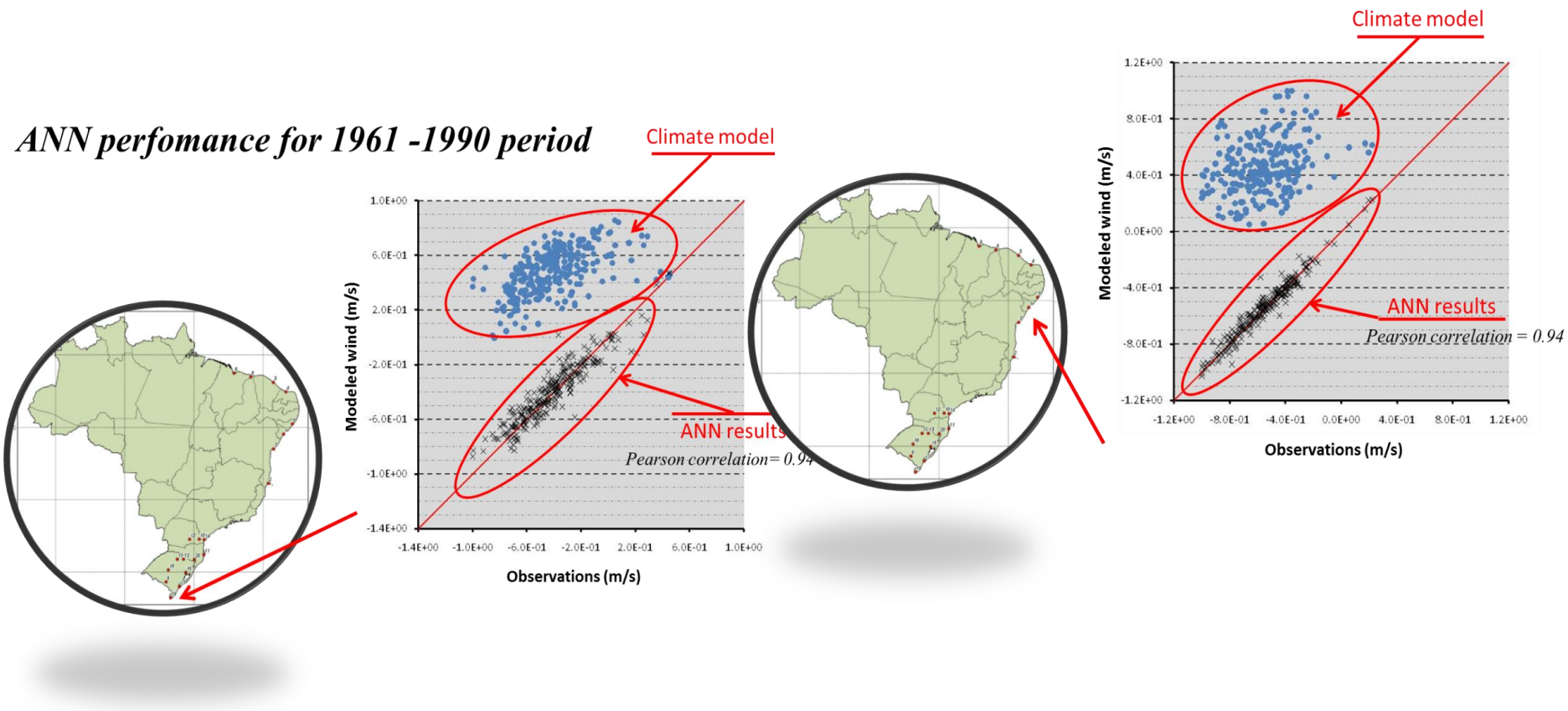


MHD/CCST)





Climate Projections

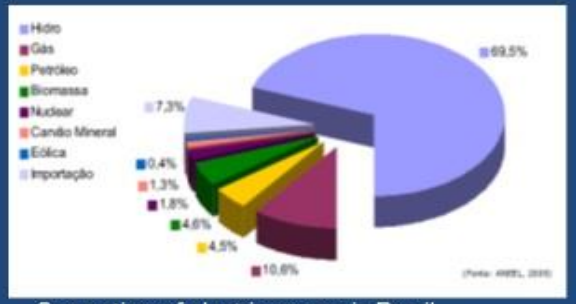


Slide: Rodrigo Costa

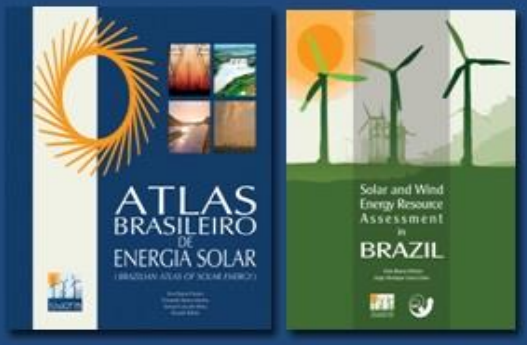
2 – OBSERVATION SYSTEM OF THE EARTH SYSTEM

✓The monitoring network coordinated by the CCST quest to build a reliable database, with a history and future perspective that allow to capture the effects of global environmental changes, bringing the information to the public domain to support decision-making.

✓Currently, the information generated by the CCST subsidize not only the strategic objectives of the modeling Center, the construction of scenarios and diagnostics of human action in the Middle, as well as other areas of the INPE.

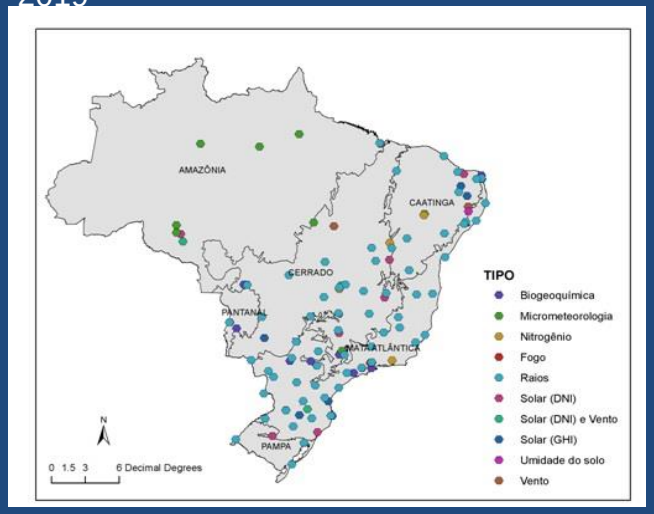


Generation of electric energy in Brazil (CEPEL)

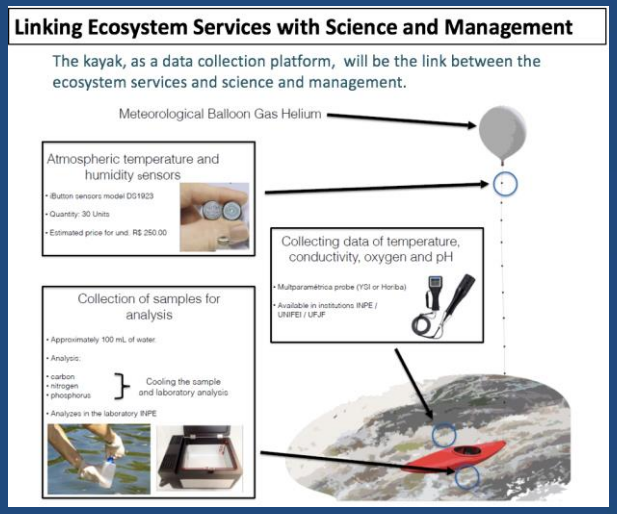


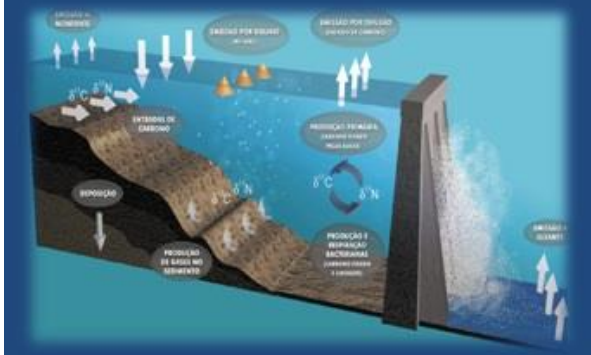
Atlas of Solar Energy and SWERA project (PNUMA-GEF)

CCST observation network between 2016-2019



Projeto Cachoeiras





O balanço de carbono em barragens tropicais

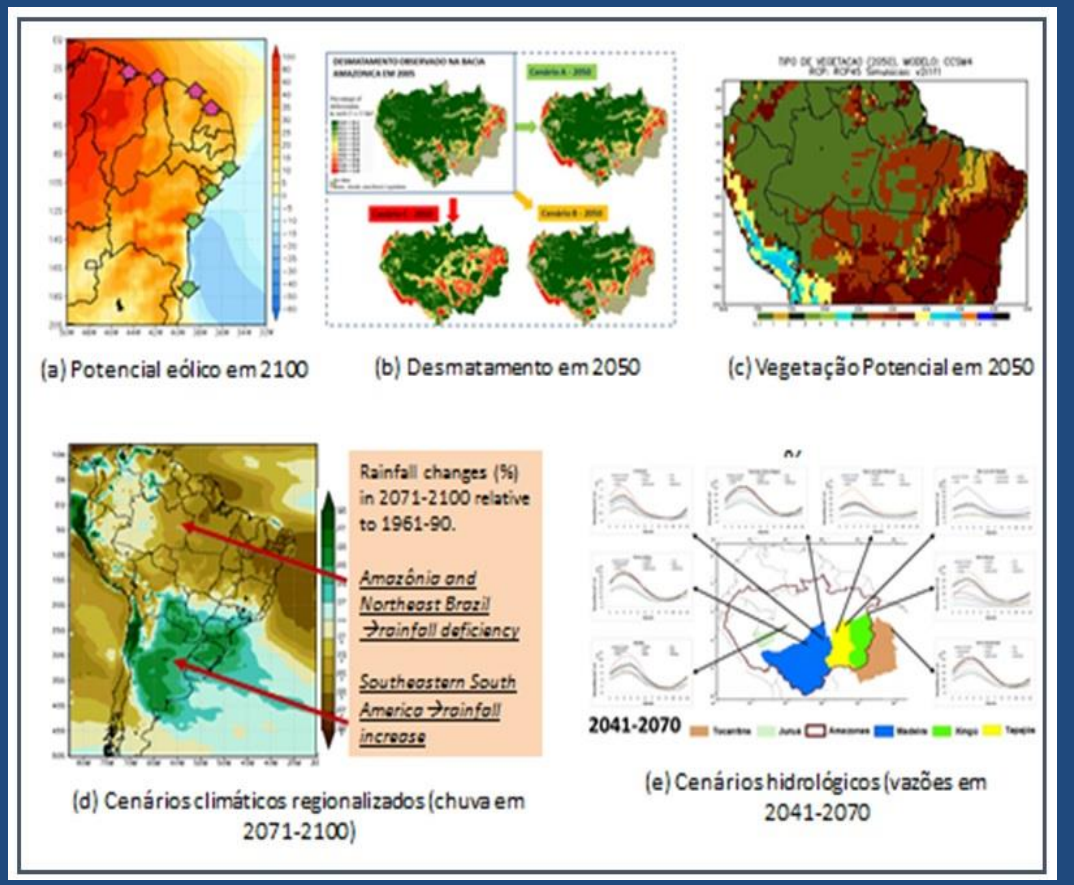
3 – DIAGNOSTIC AND SCENARIOS OF THE EARTH SYSTEM

✓This nucleus aims at formulating scenarios for a sustainable national development, integra ting results of observation and modeling activities.

✓It is proposed here to transition from traditional search logic, focused on environmental impact studies, for the analysis of the trajectories, limits and spatio-temporal patterns under which the stability of natural systems can be sustained.

✓This transition represents one of the greatest challenges to modern science and also a key element to support the formulation of public policies more consistent.

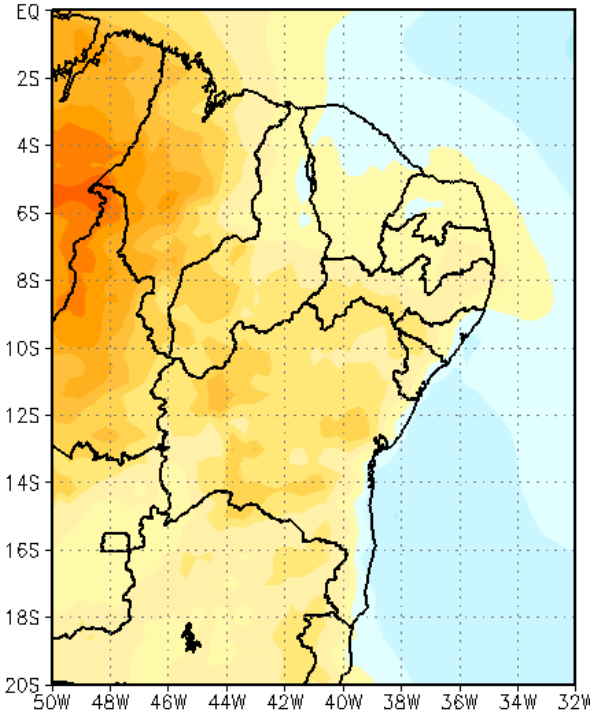
✓The product of the work of the CCST in this scenario will be the component of dissemination of scientific knowledge related to global environmental changes and the transition to environmental sustainability



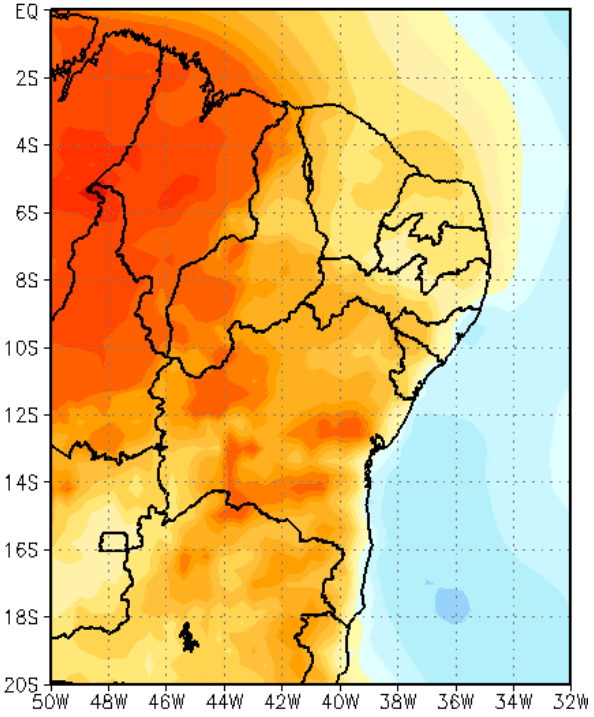
Examples of scenarios generated by the CCST currently, and that will be extended for the period 2016-2019.

Wind potential – study looking at energy production potential and scenarios

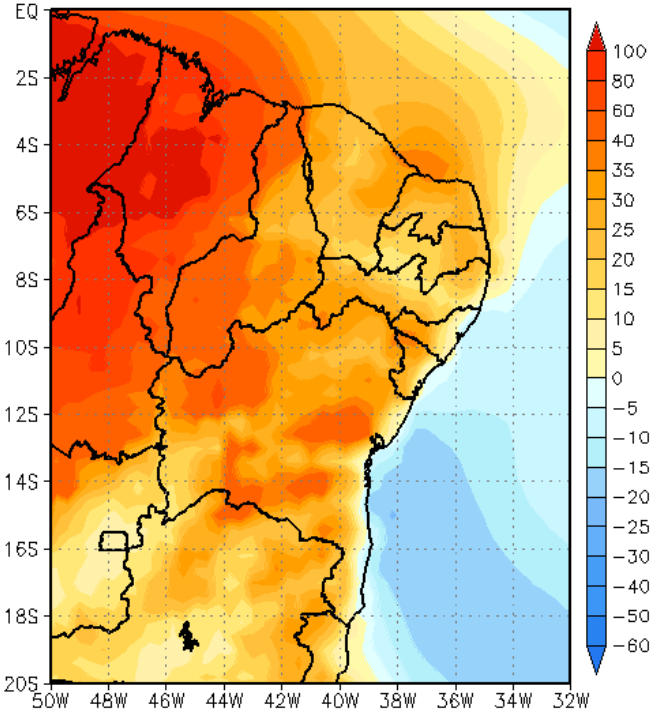
2011–2040



2041–2070



2071–2100



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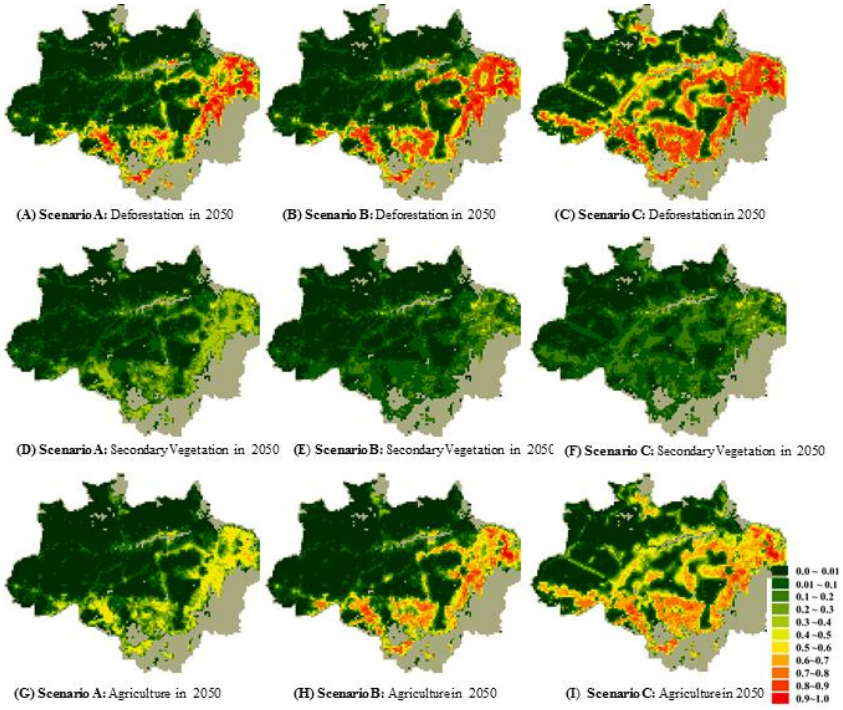
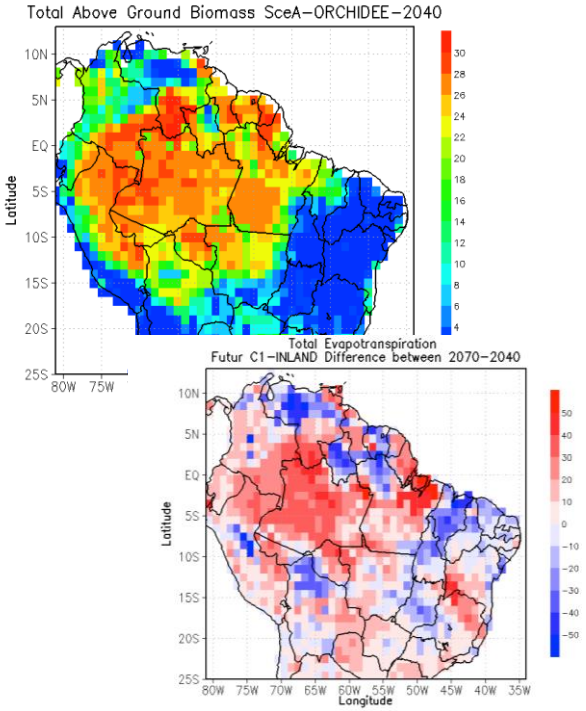
Exemplo AMAZALERT

Analysing impacts in provisioning of environmental services

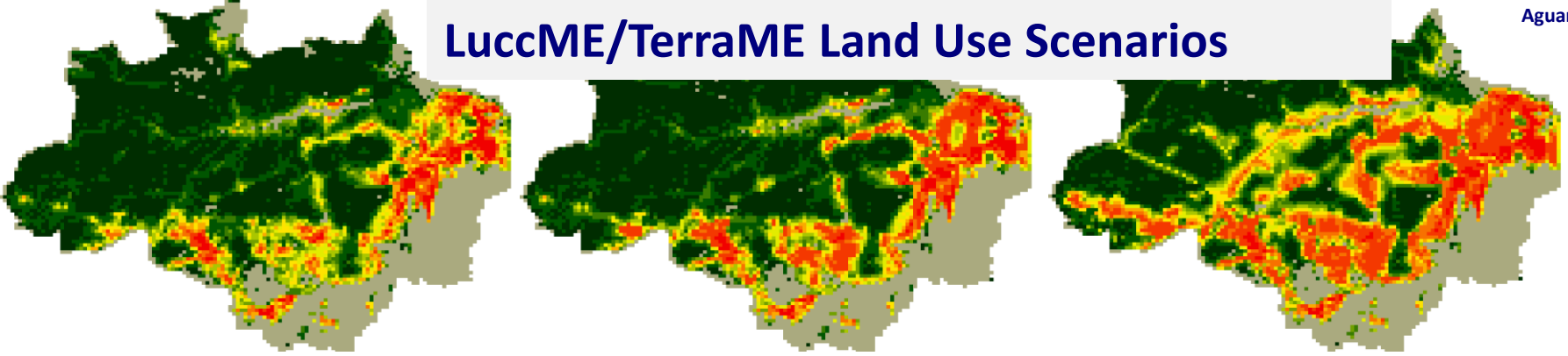
- Participative scenarios => Projections of LUCC => Hidrological and biosphere simulations => Impacts on hydrological cycle, biomass and state of the forest



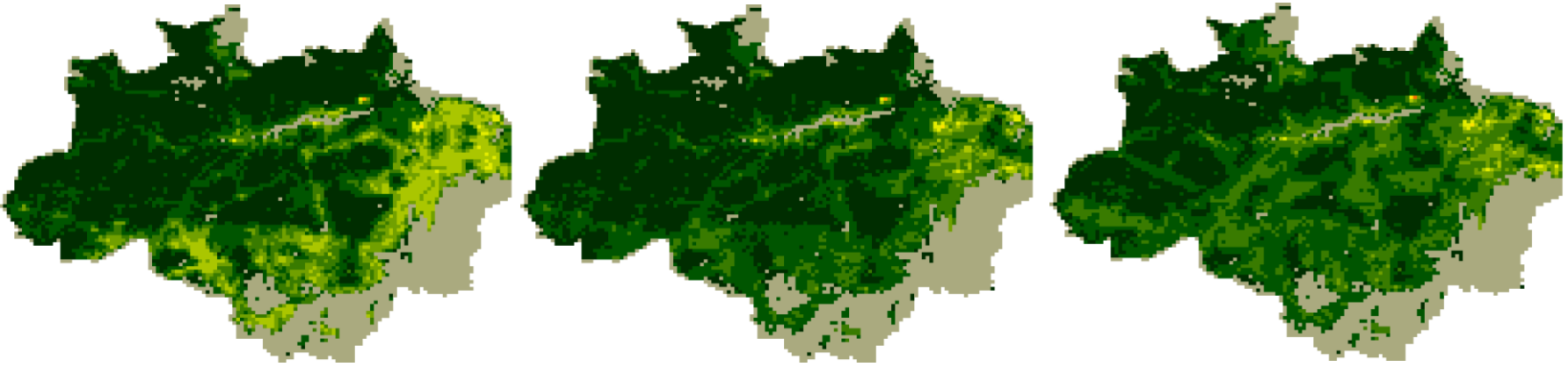


LuccME/TerraME Land Use Scenarios

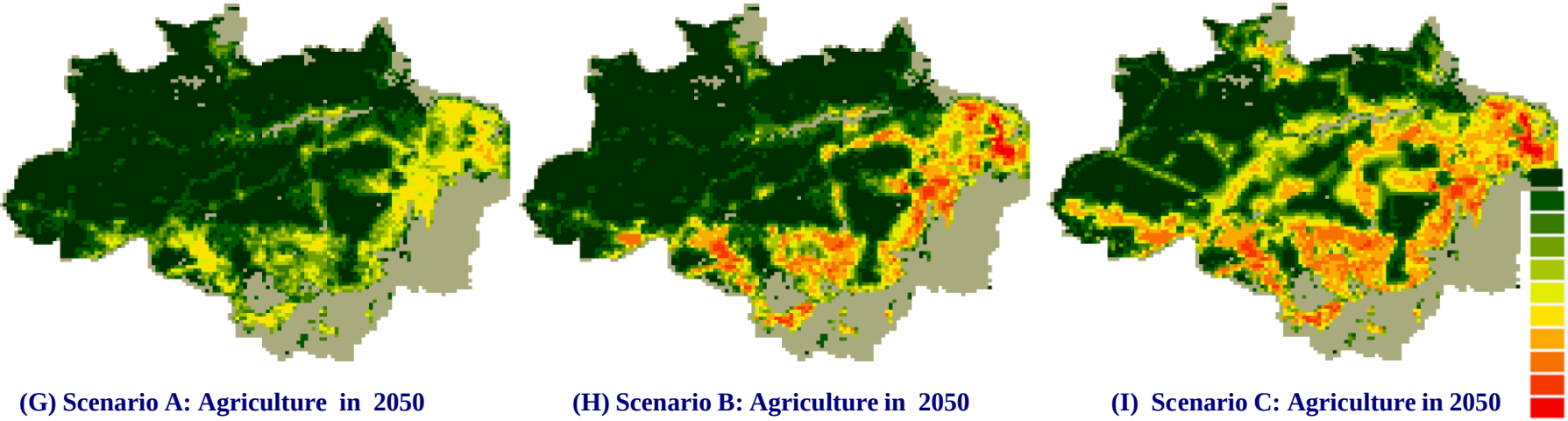
Aguar et al., 2014)



(A) Scenario A: Deforestation in 2050 (B) Scenario B: Deforestation in 2050 (C) Scenario C: Deforestation in 2050



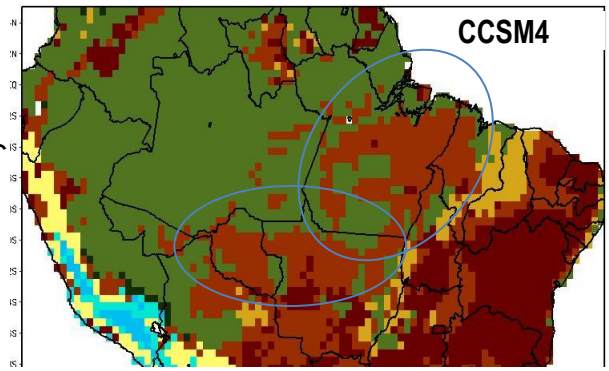
(D) Scenario A: Secondary Vegetation in 2050 (E) Scenario B: Secondary Vegetation in 2050 (F) Scenario C: Secondary Vegetation in 2050

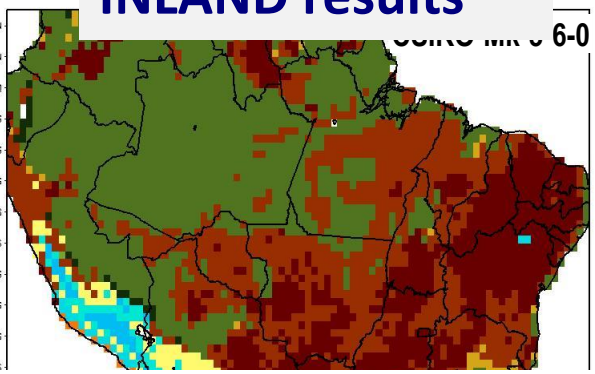


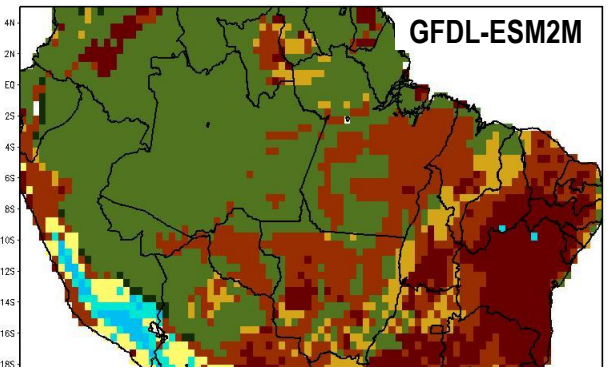
(G) Scenario A: Agriculture in 2050 (H) Scenario B: Agriculture in 2050 (I) Scenario C: Agriculture in 2050

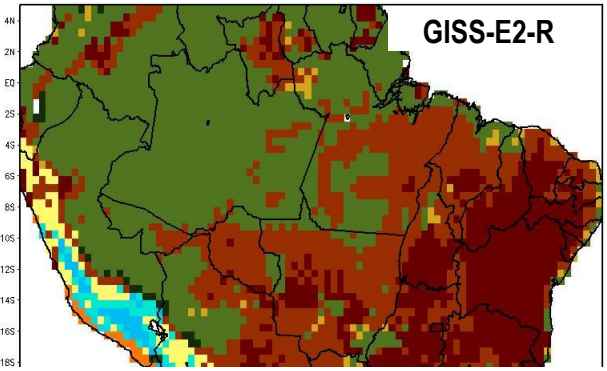
INLAND results

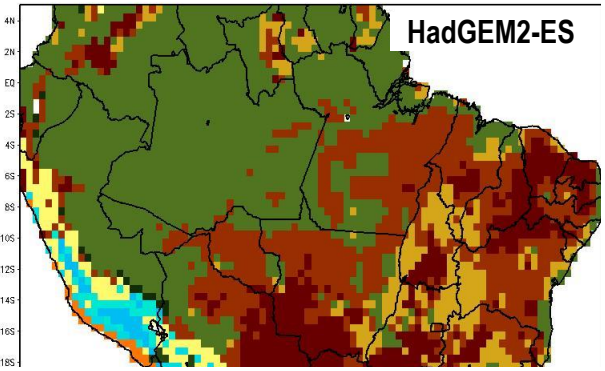
Vegetation Type – 2050: INLAND RCP4.5, LandUSE – ON , FIRE - ON

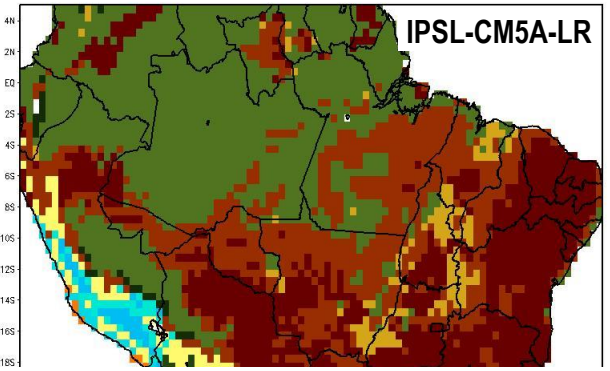


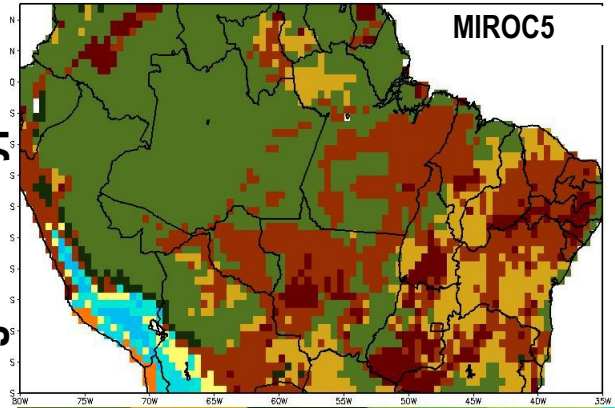


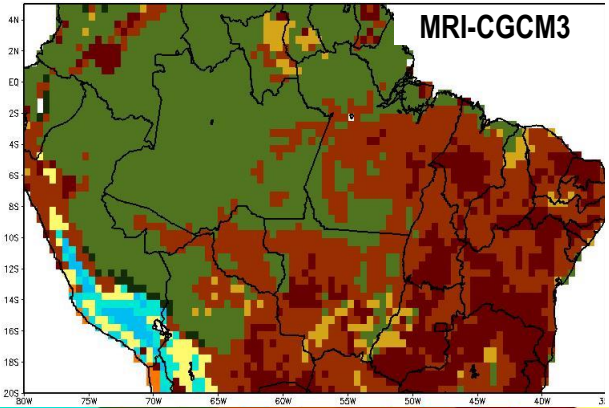


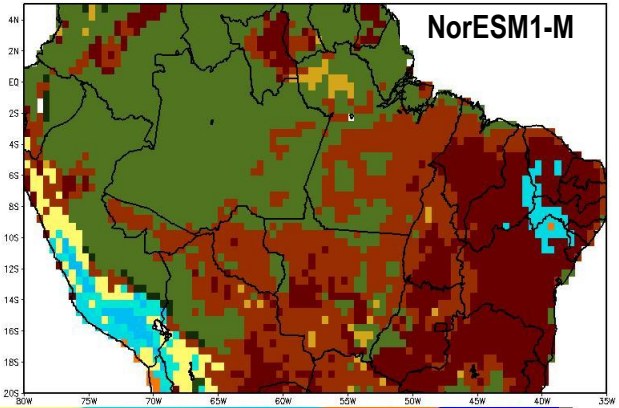


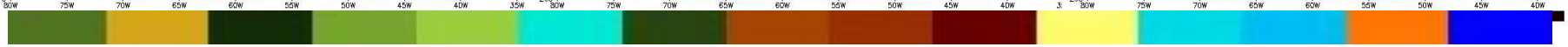






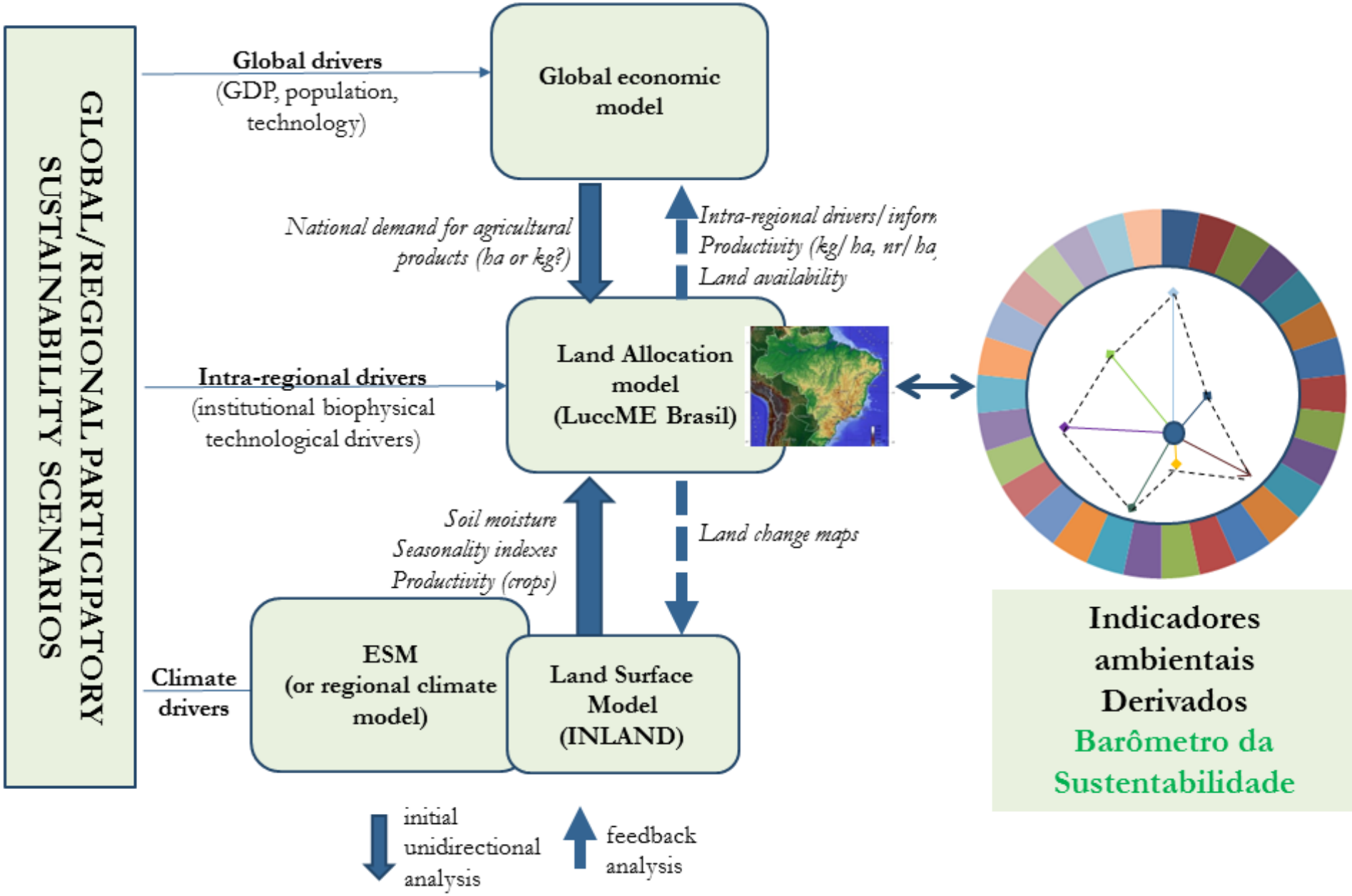




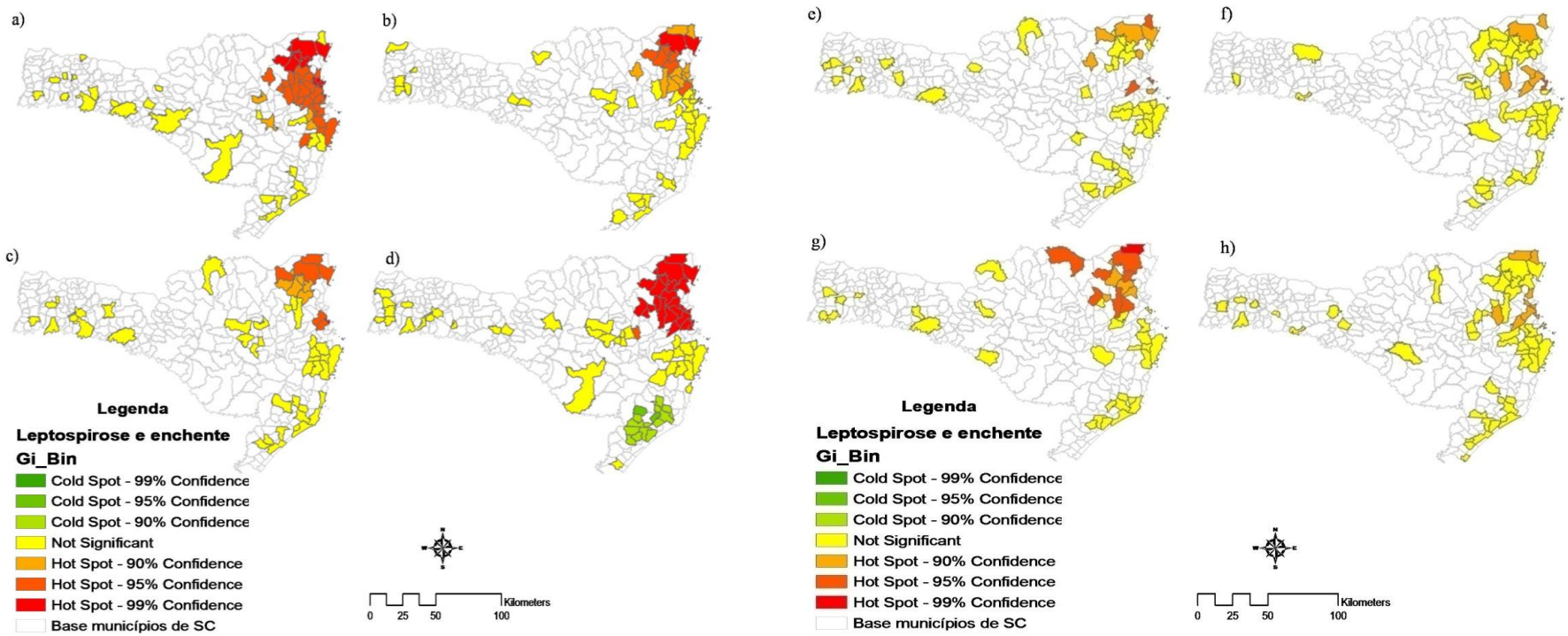


1-Tropical evergreen | 2-Tropical deciduous | 3-Temp. evergreen broadleaf | 4-Temp. evergreen conifer | 5-Temp. deciduous | 6-Boreal evergreen | 7-Boreal deciduous | 8-Mixed forest | 9-Savanna | 10-Grass. Steppe | 11-Dense shrubland | 12-Open shrubland | 13-Tundra | 14-Desert | 15-Polar desert / rock /

Integrating Projections and Scenarios to produce sustainable indicators



Spatial evolution of leptospirosis and flooding in Santa Catarina (2008– 2015)

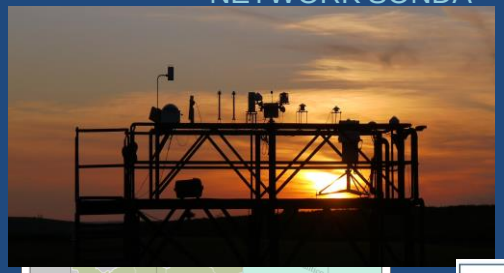


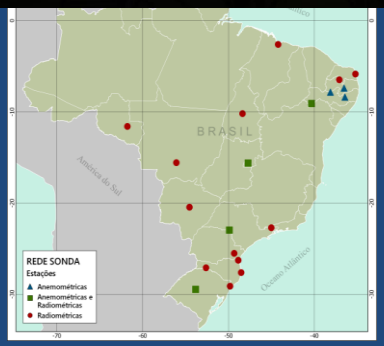
Análise Hot Spot (Getis-Ord Gi*, ArcGis) das ocorrências de inundações e os casos de leptospirose em Santa Catarina - a) 2008; b) 2009; c) 2010; d) 2011; e) 2012; f) 2013; g) 2014; h) 2015.

Lilian Diesel

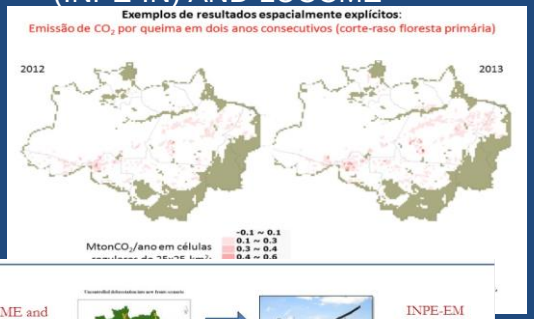
APPLICATION AND PRODUSTS

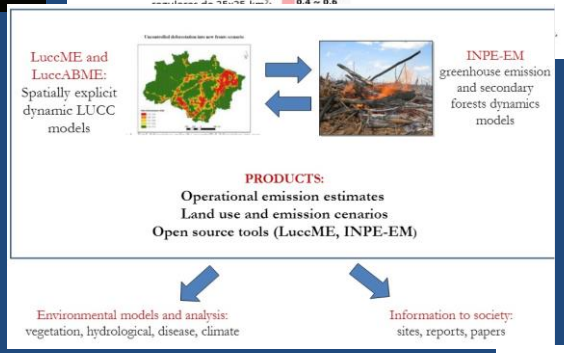
NETWORK SONDA



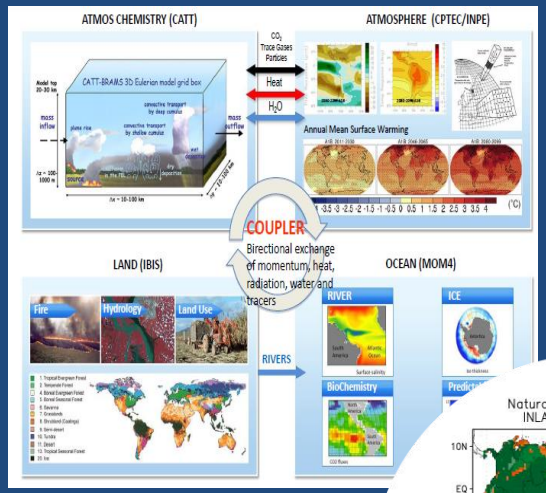


EMISSION MODELS (INPE-IN) AND LUCCME

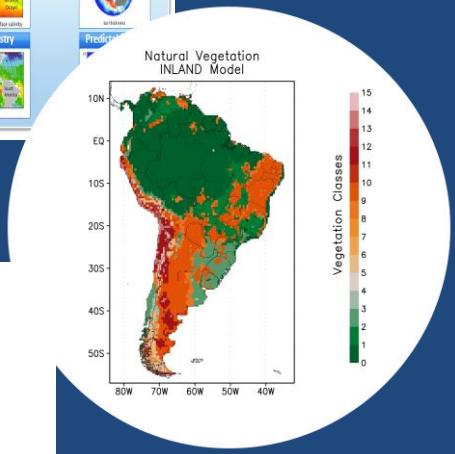




BESM – BRAZILIAN MODEL OF THE EARTH SYSTEM

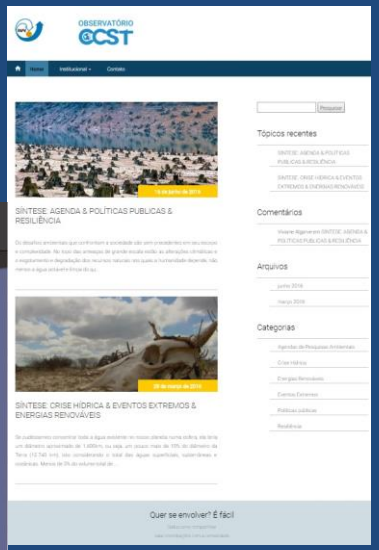


INLAND

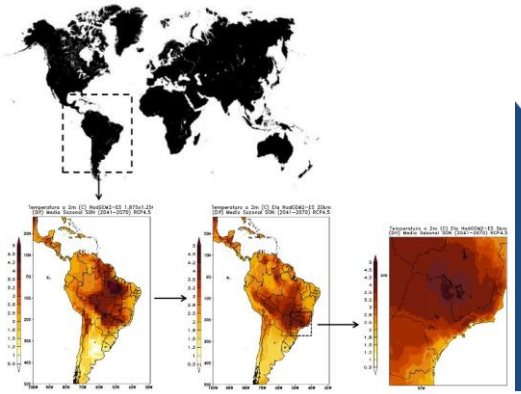


MONITORING NETWORK LIGHTNING BRASILDAT

OBSSERVATÓRIO CCST

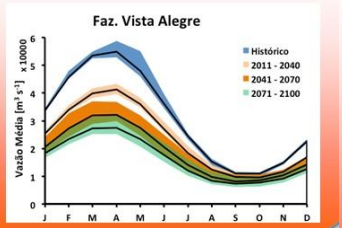


CLIMATE PROJECTIONS

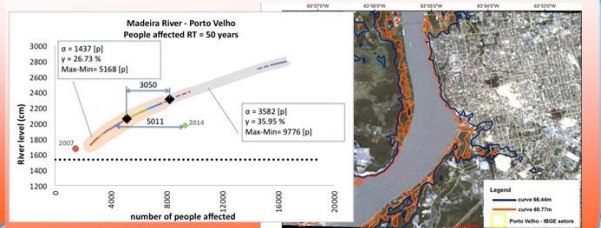


HIDROLOGICO MODEL – MHD-INPE

Impactos das Mudanças Climáticas



Impactos de eventos hidrológicos extremos



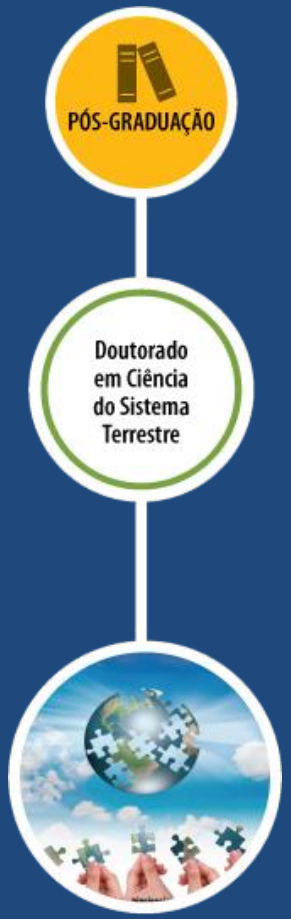
POST GRADUATION - PHD CCST

Since February 2010

Objective: training human resources, doctoral level, to meet the institutional, national and scientific demands related to impacts, vulnerabilities, social and public policy processes related to regional and global environmental change.

Lines of research

1-Integrated Earth System Modeling
2-studies of impacts, adaptation and vulnerability
3-technologies for mitigation and adaptation
4-political ecology of global changes and regional development
5-Biogequímicos Cycles
6-methods and techniques for socio-environmental system modeling



PROJECTS AND PARTNERS

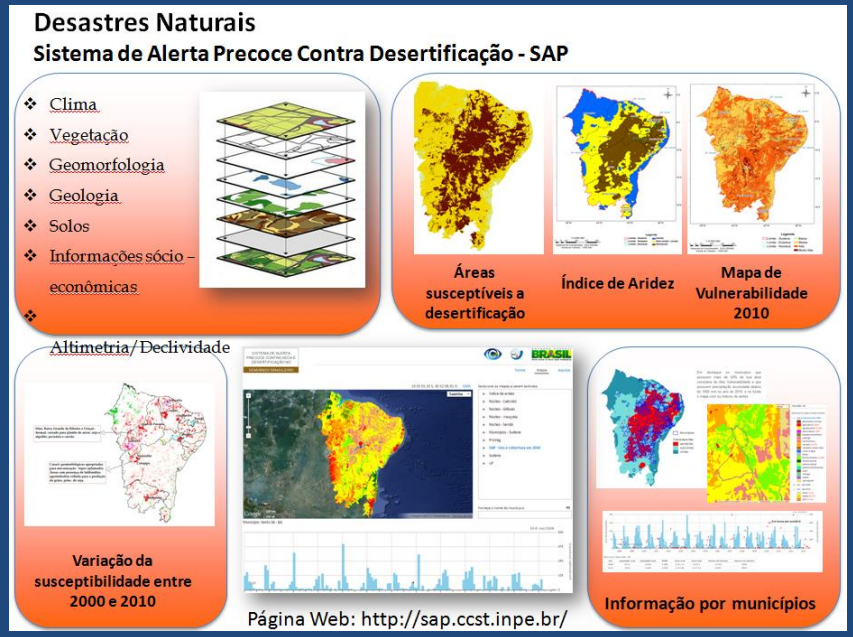
REDE CLIMA (REDE DE PESQUISAS EM MUDANÇAS CLIMÁTICAS DO MCT)

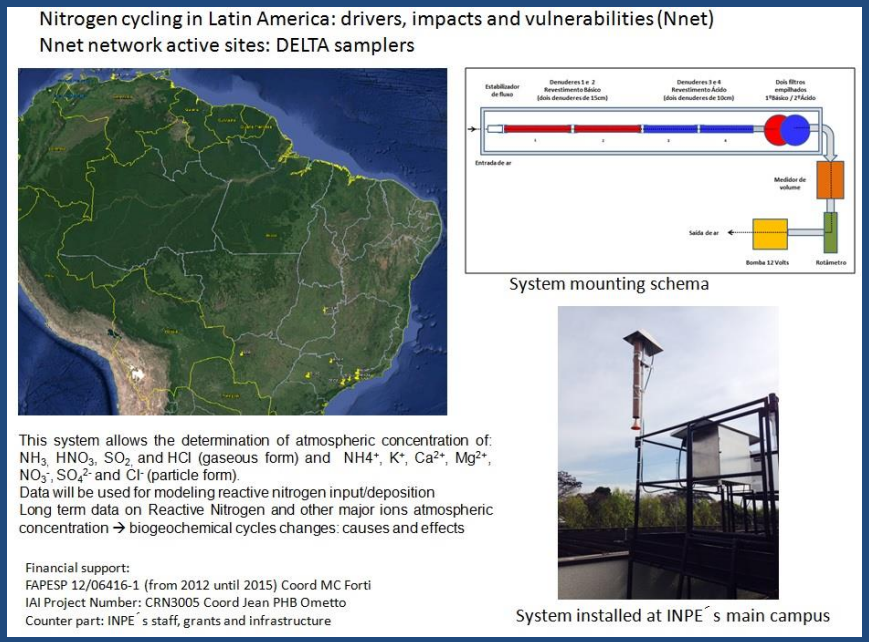
A Rede Clima foi criada pelo MCT em 2007. Seu objetivo principal é gerar e disseminar novos conhecimentos sobre as mudanças climáticas no Brasil. Assim o país poderá responder aos desafios impostos pela mudança climática e, também, se preparar para as negociações internacionais sobre o clima.

Novas subredes:

- Desastres Naturais
- Oceanos
- Serviços Ambientais dos Ecossistemas

INCT – MUDANÇAS CLIMÁTICAS



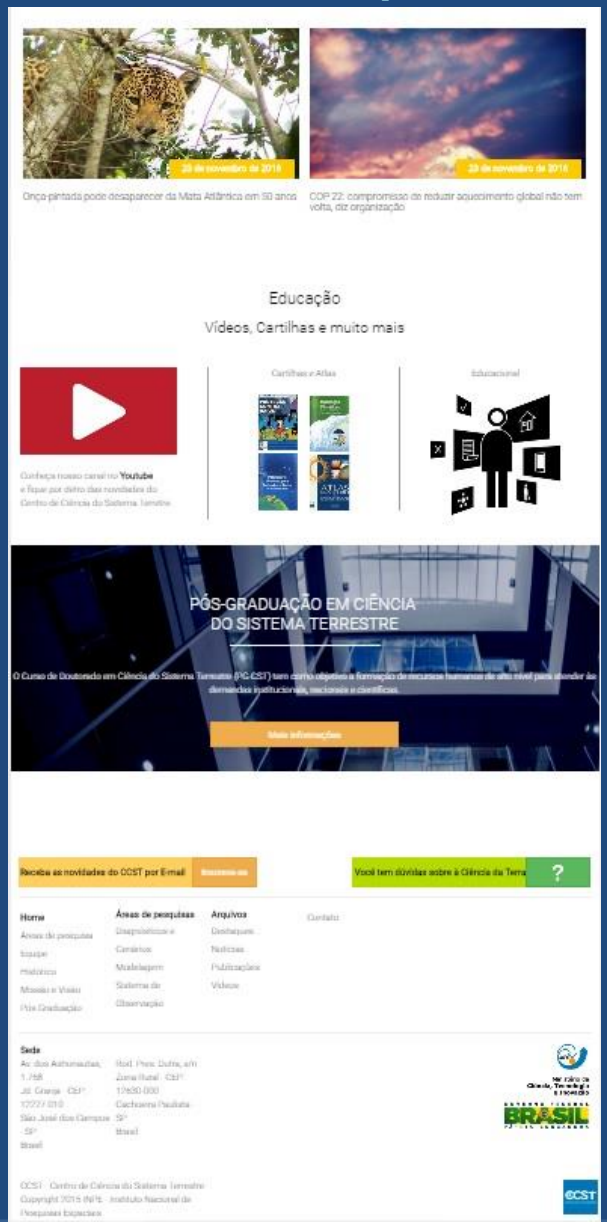


CCST IN NUMBERS

Science for Sustainability

www. ccst.inpe.br

http://pgcst.ccst.inpe.br /



THANK YOU

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STAFF AT THE CCST-CACHOEIRA PAULISTA AND SÃO JOSÉ DOS CAMPOS

CCST	
Pesquisadores	**20**
Tecnologistas	**12**
Técnicos	**5**
Analistas C&T	**1**
Estagiários e bolsistas diversos	**19** – 10 PCI
Pós Graduação (2010-2016)	78 alunos – 48 defesas **30** (alunos no CCST)
Outros serviços	**25**
Total	**112**

SCIENTIFIC PRODUCTION of the CCST in 2016

Artigos em revista	52
Artigos em Congresso	30
Capítulo de livros	03
Relatórios	02
Notas técnicas	01
Manuais	02
Teses	11
Total	101

ACCESS to the CCST´s SITE DURING the LAST 12 MONTHS

Total de secões/usuários

Brasil/Mundo - acessos externos (Interações)	INPE - acessos internos (Interações)	Toral de usuários
24.334	2.483	23.579

Tipo de usuários

Retorno (acessaram site mais de 1 vez)	Usuários Novos (acessaram pela primeira vez)	Taxa de rejeição (quando usuário abre a página e não clica em nada)	Visualizações de páginas
78.6%	20.4%	13,63	90.953

Eventos

Relatórios	Lattes	Total de downloads
688	783	1.841

Seção de maior acesso
Projetos e Parceiros

Rede Social	Total
Facebook	905

Origem dos acessos	Total de seções
Direto (ccst.inpe.br)	14.626
google	10.580
yahoo	839
facebook	660
bing	261
greenpeace	200
Facebook mobile	159
Inpe (inpe.br)	89