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Dynamic Modeling of Land Use and Coverage at Quarta Colônia, RS, Brazil

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Introduction

- *We have a many questions about changes and coverage patterns of the earth due to the accelerated process and environment impacts*
- *Incorporation of integrated scientifc models with focus on social and ecological characteristicsof the places and regions*
- *On the most used simulation models in studies of landscape is stochastic model (transition matrix), relationship of these changes*

Materials

- *Study area:*
  - *Fourth Colony in Rio Grande do Sul State, Brazil*
  - *South latitude: 29°09' to 29°58'*
  - *West longitude: 53°10' to 53°55'*
- *Data Images:*
  - *TM and ETM+ Landsat, years 1988, 2002 and 2008*
  - *Topograph charts, 1:50.000 scale*
- *Simulation software:*
  - *Dinamica EGO (Environment for Geoprocessing Objects)*

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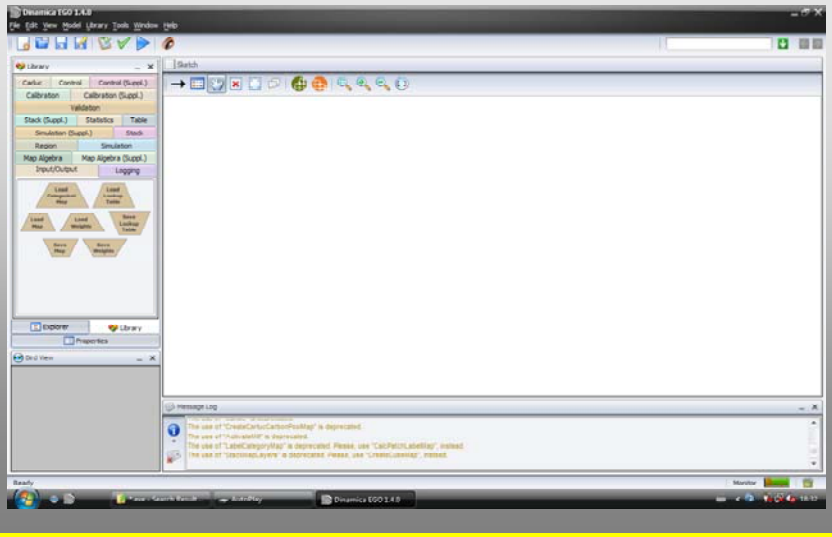
Methodological procedures

- *Supervisioned classification data images – thematic maps, land use and land cover*
- *Digital Topographic Database obtained of the Shuttel Radar Topography Mission*
- *Distance maps was grouped into classes of distances with a same range, buffers predetermined*
- *Steps in Dinamica EGO software*
  - *Determination of the transition matrix from 1988 to 2002 and from 2002 to 2008 years; evidence as weights of the variables; applying correlation; calculation of maps*
  - *Model validation through fuzzy method using the procedures of exponential decay function and the function decay constant*
  - *Simulation model for the 2018 year*

GUI Dinamica software



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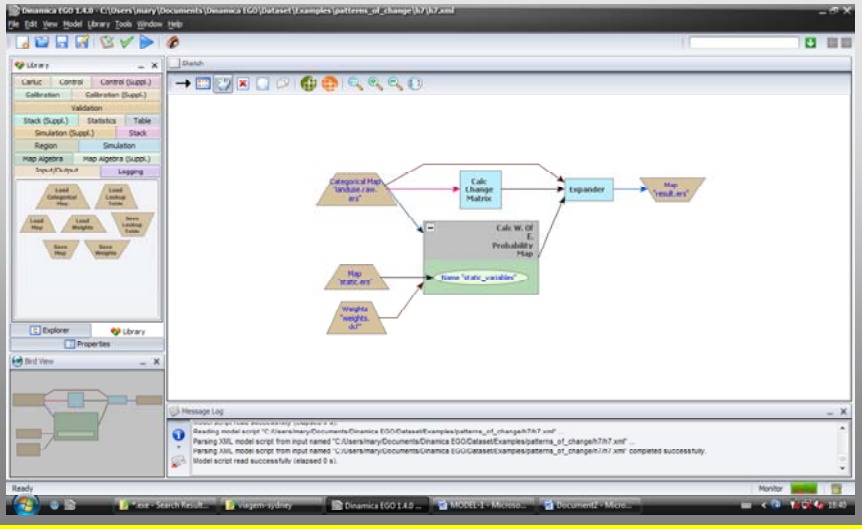
Example graphic model



Results

- Classification images – Kappa index with values around the 0.99;
- Land use classes and coverage areas (hectares)

Use Classes and coverage Earth	*Use 1988*	*Use 2002*	*Use 2008*
Forest	89,187	92,941	93,217
Field	117,726	103,807	101,332
Agricultural soil	85,155	91,504	96,544
Water	2,050	5,866	3,025
Total	294,118	294,118	294,118

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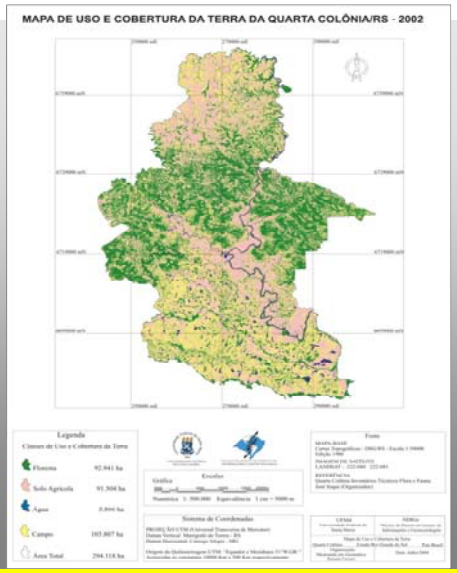
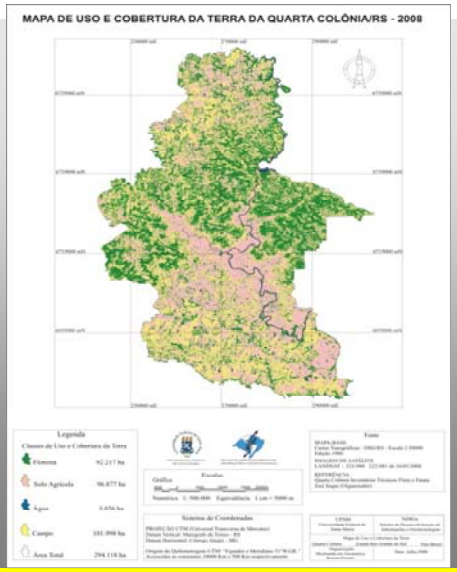
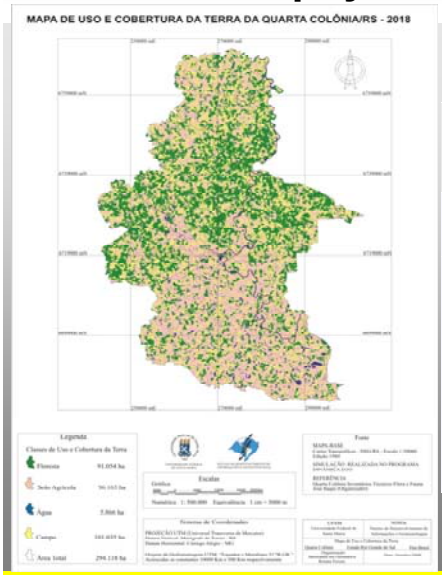
Thematic maps: years 2002 and 2008





Thematic map: year 2018



Land use and coverage to 2018

Use Classes and coverage (ha)	*Use 1988*	*Use 2002*	*Use 2008*	*Forecast Use 2018*
Forest	89,18	92,941	92,216	91,054
Field	117,72	103,80	101,33	101,03
Agricultural soil	85,15	91,50	96,54	96,16
Water	2,05	5,86	3,02	5,86
Total	294,11	294,11	294,11	294,11

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Conclusions

- *The quantification of simulated 2018 map also contributes to reaffirm that the trends of development (increase/decrease) remain virtually the same views changes land use and cover between periods of 1988-2002 and 2002-2008*

- *The platform used for modeling in Dinâmica EGO proved satisfactory compliance of the objectives of this work, by support, and other characteristics, an open and flexible framework for the use of different methods of parameterization and variable sets which associated wisely, attended the specificities of modeling study area, with special patterns of coverage conversion use and land cover.*

References

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Thank you for your attention!