

Supplementary Material

Spatial dynamic models for assessing the impact of public policies: the case of unified educational centers in the periphery of São Paulo city

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Supplementary Material: Transition matrices

Table S1. CEU Alvarenga global transitions rates for the 1st and 2nd simulation periods.

Transitions 2000–2004				Transitions 2004–2010			
CEU	From	To	Rate	CEU	From	To	Rate
Alvarenga	Vacant Plots	Residential Use	0.01208	Alvarenga	Tree Vegetation	Informal Settlements	0.01924
Alvarenga	Vacant Plots	Institutional Use	0.00659	Alvarenga	Vacant Plots	Residential Use	0.02606
Alvarenga	Vacant Plots	Commerce and Services	0.02437	Alvarenga	Vacant Plots	Informal Settlements	0.02501

Table S2. CEU Butantã global transitions rates for the 1st and 2nd simulation periods.

Transitions 2000–2004				Transitions 2004–2010			
CEU	From	To	Rate	CEU	From	To	Rate
Butantã	Informal Settlements	Vacant Plots	0.01429	Butantã	Tree Vegetation	Residential Use	0.028388
Butantã	Vacant Plots	Residential Use	0.01181	Butantã	Residential Use	Institutional Use	0.001268
Butantã	Vacant Plots	Informal Settlements	0.02594	Butantã	Informal Settlements	Vacant Plots	0.014112
Butantã	Vacant Plots	Institutional Use	0.00780	Butantã	Vacant Plots	Residential Use	0.19953
Butantã	Vacant Plots	Commerce and Services	0.03165	Butantã	Vacant Plots	Informal Settlements	0.010852
				Butantã	Vacant Plots	Institutional Use	0.089622
				Butantã	Vacant Plots	Commerce and Services	0.001679
				Butantã	Institutional Use	Residential Use	0.00792
				Butantã	Commerce and Services	Residential Use	0.038424
				Butantã	Commerce and Services	Vacant Plots	0.008181

Table S3. CEU Campo Limpo global transitions rates for the 1st and 2nd simulation periods.

Transitions 2000–2004				Transitions 2004–2010			
CEU	From	To	Rate	CEU	From	To	Rate
Campo Limpo	Vacant Plots	Residential Use	0.056166	Campo Limpo	Informal Settlements	Residential Use	0.018546
Campo Limpo	Vacant Plots	Informal Settlements	0.00854	Campo Limpo	Vacant Plots	Residential Use	0.073832
Campo Limpo	Vacant Plots	Commerce and Services	0.020405	Campo Limpo	Vacant Plots	Informal Settlements	0.132078
				Campo Limpo	Vacant Plots	Institutional Use	0.069982
				Campo Limpo	Vacant Plots	Commerce and Services	0.033157

Table S4. CEU Feitiço da Vila global transitions rates for the 1st and 2nd simulation periods.

Transitions 2000–2004				Transitions 2004–2010			
CEU	From	To	Rate	CEU	From	To	Rate
Feitiço da Vila	Tree Vegetation	Informal Settlements	0.05034	Feitiço da Vila	Informal Settlements	Residential Use	0.04776
Feitiço da Vila	Informal Settlements	Residential Use	0.00551	Feitiço da Vila	Informal Settlements	Vacant Plots	0.00561
Feitiço da Vila	Informal Settlements	Vacant Plots	0.00369	Feitiço da Vila	Vacant Plots	Residential Use	0.01232
Feitiço da Vila	Vacant Plots	Residential Use	0.00426	Feitiço da Vila	Vacant Plots	Institutional Use	0.00397
Feitiço da Vila	Vacant Plots	Informal Settlements	0.027395				
Feitiço da Vila	Vacant Plots	Institutional Use	0.005873				
Feitiço da Vila	Vacant Plots	Commerce and Services	0.006843				

Table S5. CEU Inácio Monteiro global transitions rates for the 1st and 2nd simulation periods.

Transitions 2000–2004				Transitions 2004–2010			
CEU	From	To	Rate	CEU	From	To	Rate
Inácio Monteiro	Tree Vegetation	Residential Use	0.00377	Inácio Monteiro	Informal Settlements	Residential Use	0.08329
Inácio Monteiro	Vacant Plots	Residential Use	0.09927	Inácio Monteiro	Informal Settlements	Vacant Plots	0.07280
Inácio Monteiro	Vacant Plots	Informal Settlements	0.00667	Inácio Monteiro	Vacant Plots	Residential Use	0.05814
Inácio Monteiro	Vacant Plots	Institutional Use	0.00604	Inácio Monteiro	Vacant Plots	Informal Settlements	0.01512
Inácio Monteiro	Vacant Plots	Commerce and Services	0.00267	Inácio Monteiro	Vacant Plots	Institutional Use	0.04027
				Inácio Monteiro	Vacant Plots	Commerce and Services	0.02022
				Inácio Monteiro	Commerce and Services	Vacant Plots	0.00026

Table S6. CEU Navegantes global transitions rates for the 1st and 2nd simulation periods.

Transitions 2000–2004				Transitions 2004–2010			
CEU	From	To	Rate	CEU	From	To	Rate
Navegantes	Vacant Plots	Informal Settlements	0.00474	Navegantes	Informal Settlements	Residential Use	0.03046
Navegantes	Vacant Plots	Institutional Use	0.01289	Navegantes	Informal Settlements	Vacant Plots	0.02440
Navegantes	Vacant Plots	Commerce and Services	0.02220	Navegantes	Vacant Plots	Residential Use	0.00359
				Navegantes	Vacant Plots	Informal Settlements	0.00810
				Navegantes	Vacant Plots	Institutional Use	0.00878
				Navegantes	Vacant Plots	Commerce and Services	0.00671
				Navegantes	Commerce and Services	Vacant Plots	0.02986

Table S7. CEU Parque Veredas global transitions rates for the 1st and 2nd simulation periods.

Transitions 2000–2004				Transitions 2004–2010			
CEU	From	To	Rate	CEU	From	To	Rate
Parque Veredas	Informal Settlements	Residential Use	0.02133	Parque Veredas	Informal Settlements	Residential Use	0.05744
Parque Veredas	Vacant Plots	Residential Use	0.08787	Parque Veredas	Informal Settlements	Vacant Plots	0.00167
Parque Veredas	Vacant Plots	Informal Settlements	0.00393	Parque Veredas	Vacant Plots	Residential Use	0.12246
Parque Veredas	Vacant Plots	Institutional Use	0.01783	Parque Veredas	Vacant Plots	Informal Settlements	0.02805
Parque Veredas	Vacant Plots	Commerce and Services	0.00120	Parque Veredas	Vacant Plots	Institutional Use	0.06433
				Parque Veredas	Vacant Plots	Industrial Use	0.01284
				Parque Veredas	Vacant Plots	Commerce and Services	0.03650
				Parque Veredas	Commerce and Services	Vacant Plots	0.01917

Table S8. CEU Paz global transitions rates for the 1st and 2nd simulation periods.

Transitions 2000–2004				Transitions 2004–2010			
CEU	From	To	Rate	CEU	From	To	Rate
Paz	Tree Vegetation	Informal Settlements	0.00357	Paz	Tree Vegetation	Informal Settlements	0.00501
Paz	Tree Vegetation	Vacant Plots	0.01077	Paz	Tree Vegetation	Vacant Plots	0.00181
Paz	Informal Settlements	Residential Use	0.00347	Paz	Informal Settlements	Residential Use	0.01691
Paz	Vacant Plots	Informal Settlements	0.02051	Paz	Informal Settlements	Vacant Plots	0.02964
Paz	Vacant Plots	Commerce and Services	0.00179	Paz	Vacant Plots	Residential Use	0.01886
Paz	Industrial Use	Vacant Plots	0.13126	Paz	Vacant Plots	Informal Settlements	0.04107
				Paz	Vacant Plots	Institutional Use	0.01265
				Paz	Vacant Plots	Industrial Use	0.01609
				Paz	Industrial Use	Vacant Plots	0.17387

Table S9. CEU Pêra Marmelo global transitions rates for the 1st and 2nd simulation periods.

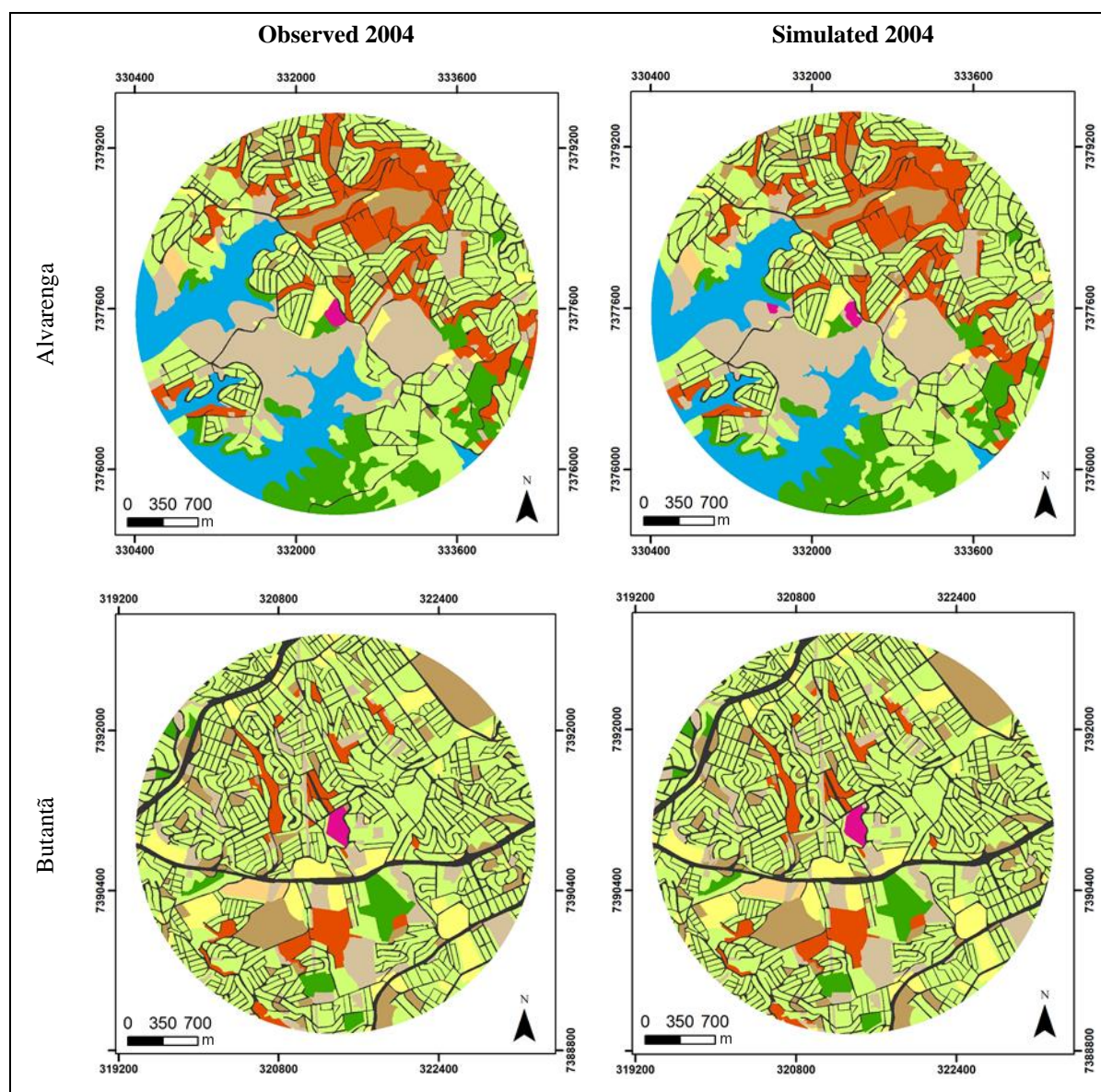
Transitions 2000–2004				Transitions 2004–2010			
CEU	From	To	Rate	CEU	From	To	Rate
Pêra Marmelo	Tree Vegetation	Informal Settlements	0.01064	Pêra Marmelo	Informal Settlements	Residential Use	0.04678
Pêra Marmelo	Informal Settlements	Residential Use	0.26109	Pêra Marmelo	Informal Settlements	Vacant Plots	0.06864
Pêra Marmelo	Informal Settlements	Vacant Plots	0.00971	Pêra Marmelo	Vacant Plots	Residential Use	0.06417
Pêra Marmelo	Vacant Plots	Residential Use	0.02886	Pêra Marmelo	Vacant Plots	Informal Settlements	0.00206
Pêra Marmelo	Vacant Plots	Informal Settlements	0.00409	Pêra Marmelo	Vacant Plots	Institutional Use	0.01436
Pêra Marmelo	Vacant Plots	Institutional Use	0.00777	Pêra Marmelo	Vacant Plots	Commerce and Services	0.00322
Pêra Marmelo	Vacant Plots	Industrial Use	0.00240	Pêra Marmelo	Commerce and Services	Residential Use	0.02416
Pêra Marmelo	Vacant Plots	Commerce and Services	0.01438				

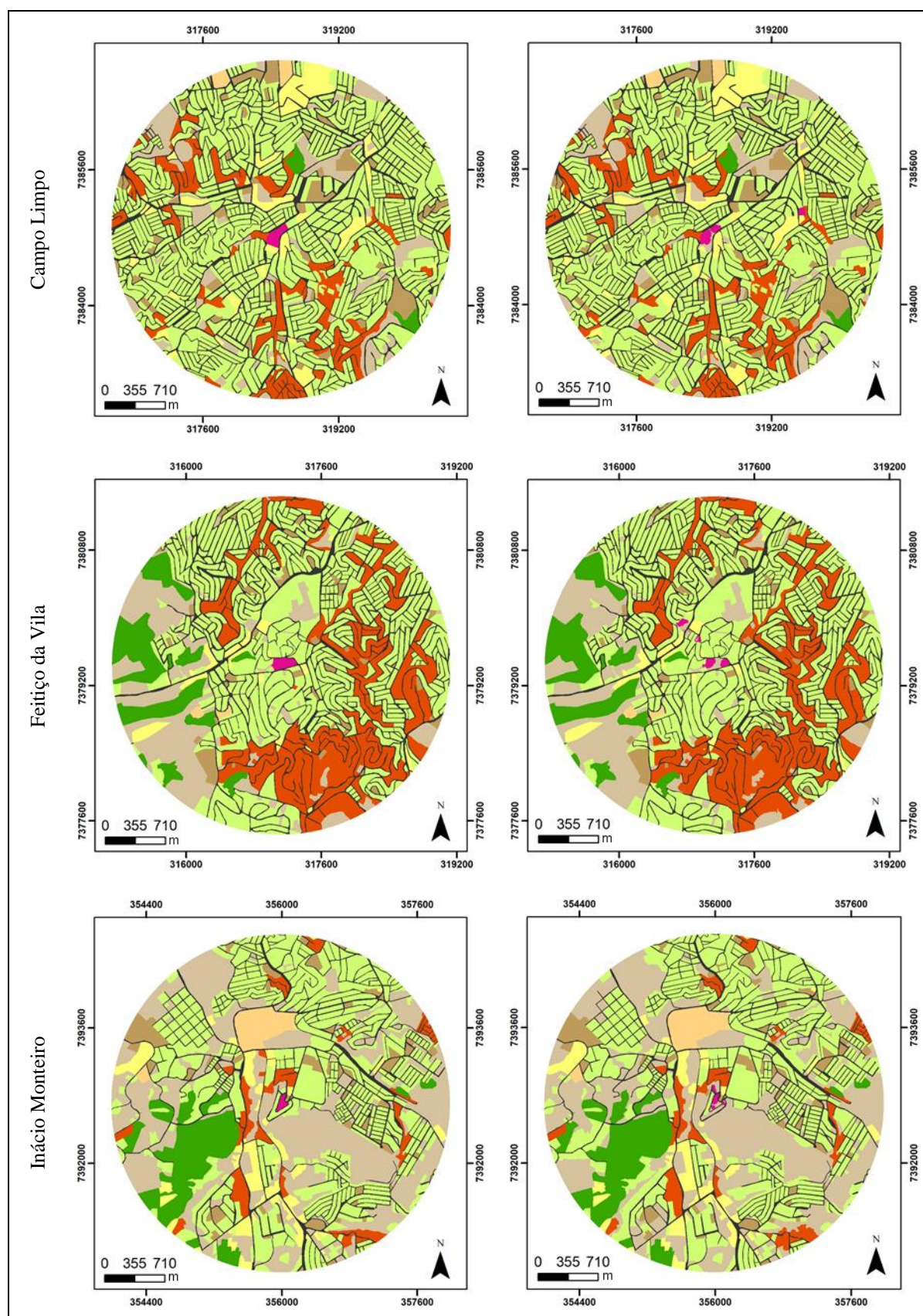
Table S10. CEU São Rafael global transitions rates for the 1st and 2nd simulation periods.

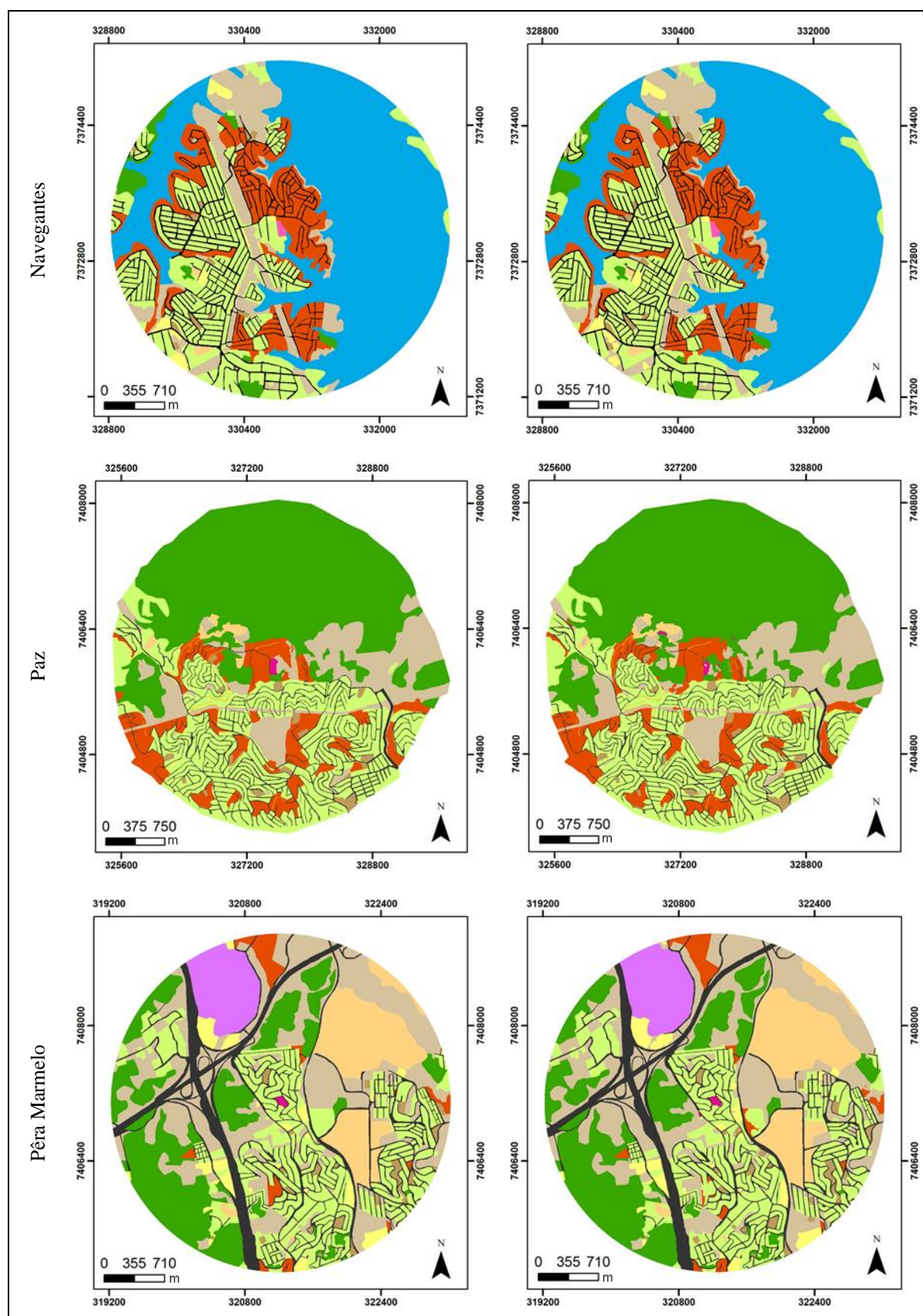
Transitions 2000–2004				Transitions 2004–2010			
CEU	From	To	Rate	CEU	From	To	Rate
São Rafael	Tree Vegetation	Vacant Plots	0.05982	São Rafael	Tree Vegetation	Informal Settlements	0.00946
São Rafael	Residential Use	Informal Settlements	0.00109	São Rafael	Tree Vegetation	Vacant Plots	0.00341
São Rafael	Vacant Plots	Residential Use	0.01206	São Rafael	Tree Vegetation	Paved Roads	0.00364
São Rafael	Vacant Plots	Informal Settlements	0.01399	São Rafael	Residential Use	Vacant Plots	0.00552
São Rafael	Vacant Plots	Institutional Use	0.00168	São Rafael	Informal Settlements	Tree Vegetation	0.00204
São Rafael	Vacant Plots	Industrial Use	0.01572	São Rafael	Informal Settlements	Residential Use	0.03303
				São Rafael	Informal Settlements	Vacant Plots	0.07249
				São Rafael	Informal Settlements	Paved Roads	0.01636
				São Rafael	Vacant Plots	Tree Vegetation	0.01260
				São Rafael	Vacant Plots	Residential Use	0.01251
				São Rafael	Vacant Plots	Informal Settlements	0.04440
				São Rafael	Vacant Plots	Institutional Use	0.00872
				São Rafael	Vacant Plots	Paved Roads	0.05993
				São Rafael	Vacant Plots	Industrial Use	0.01354
				São Rafael	Vacant Plots	Commerce and Services	0.00084
				São Rafael	Paved Roads	Vacant Plots	0.00052
				São Rafael	Commerce and Services	Vacant Plots	0.03653

Supplementary Material: Simulation results

Figure S1. Simulated and observed land use/land cover maps for the year 2004.







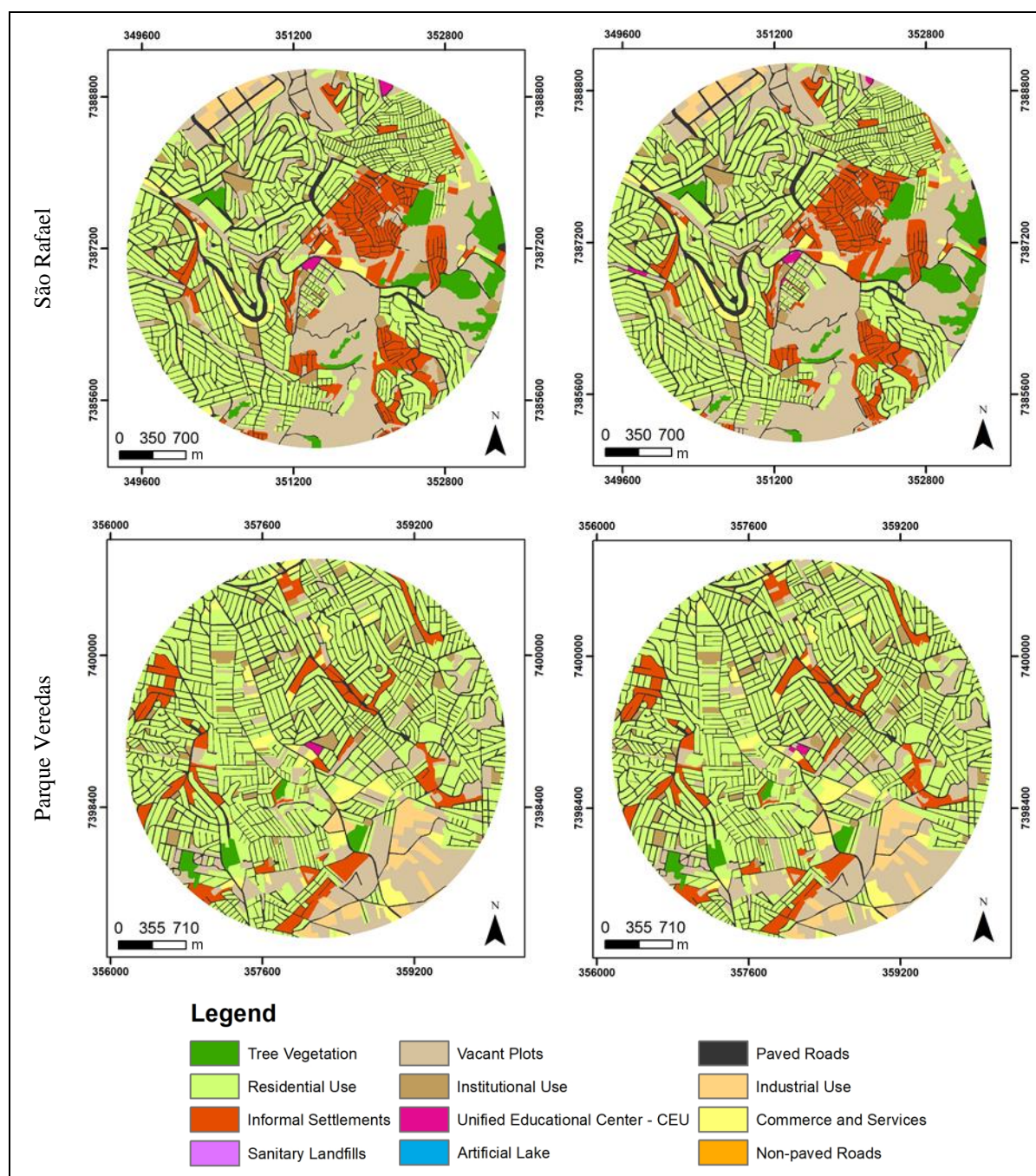
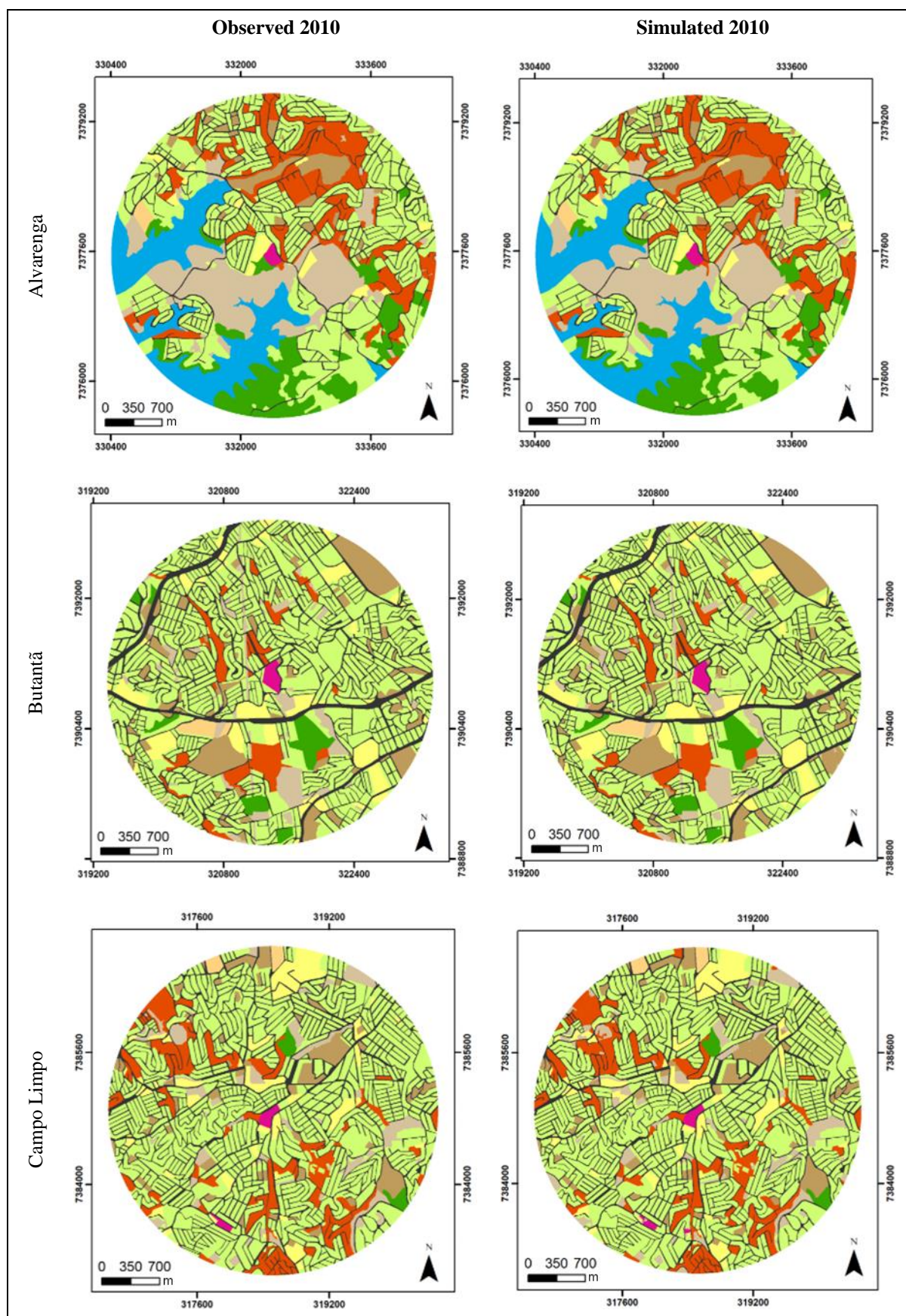
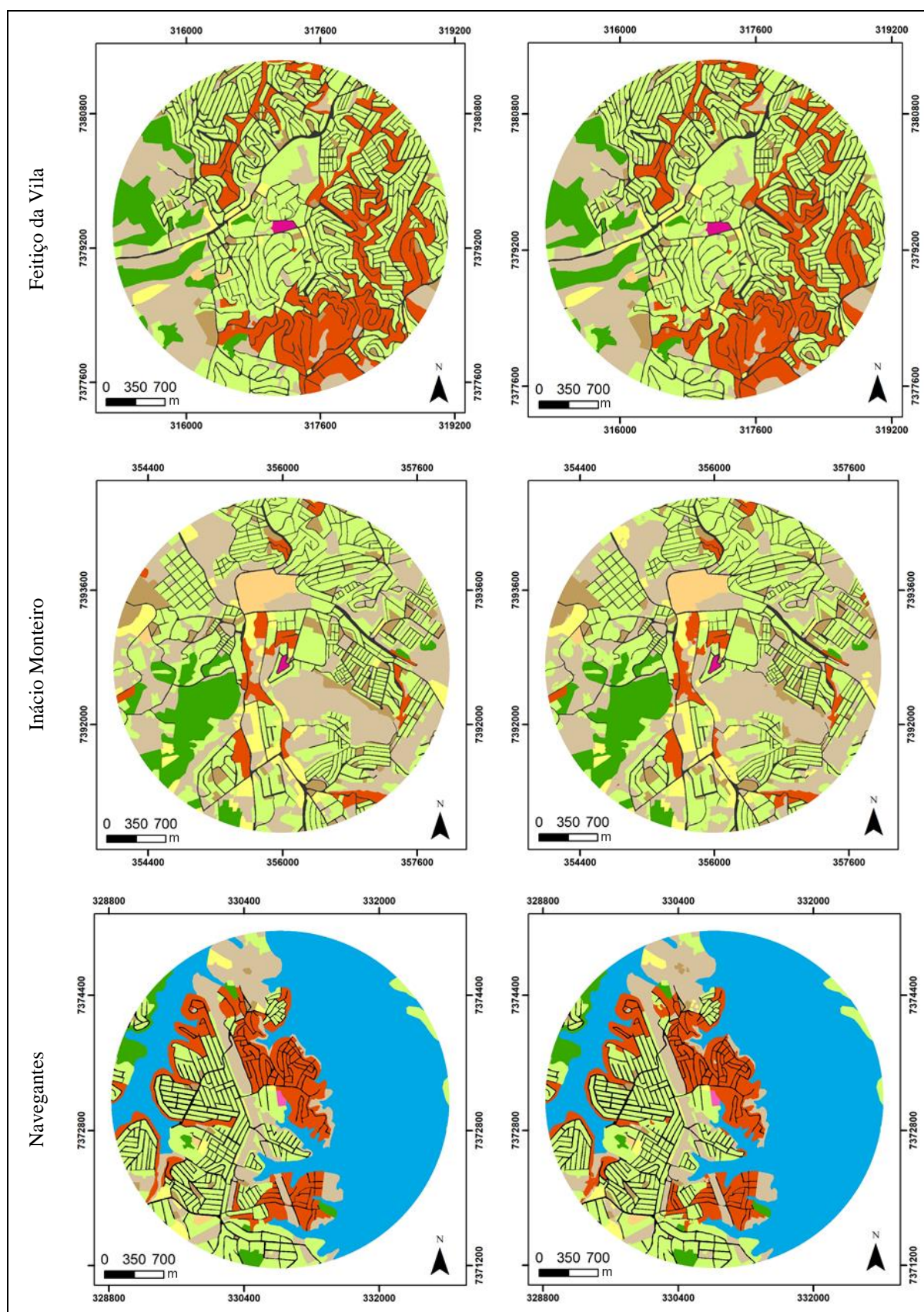
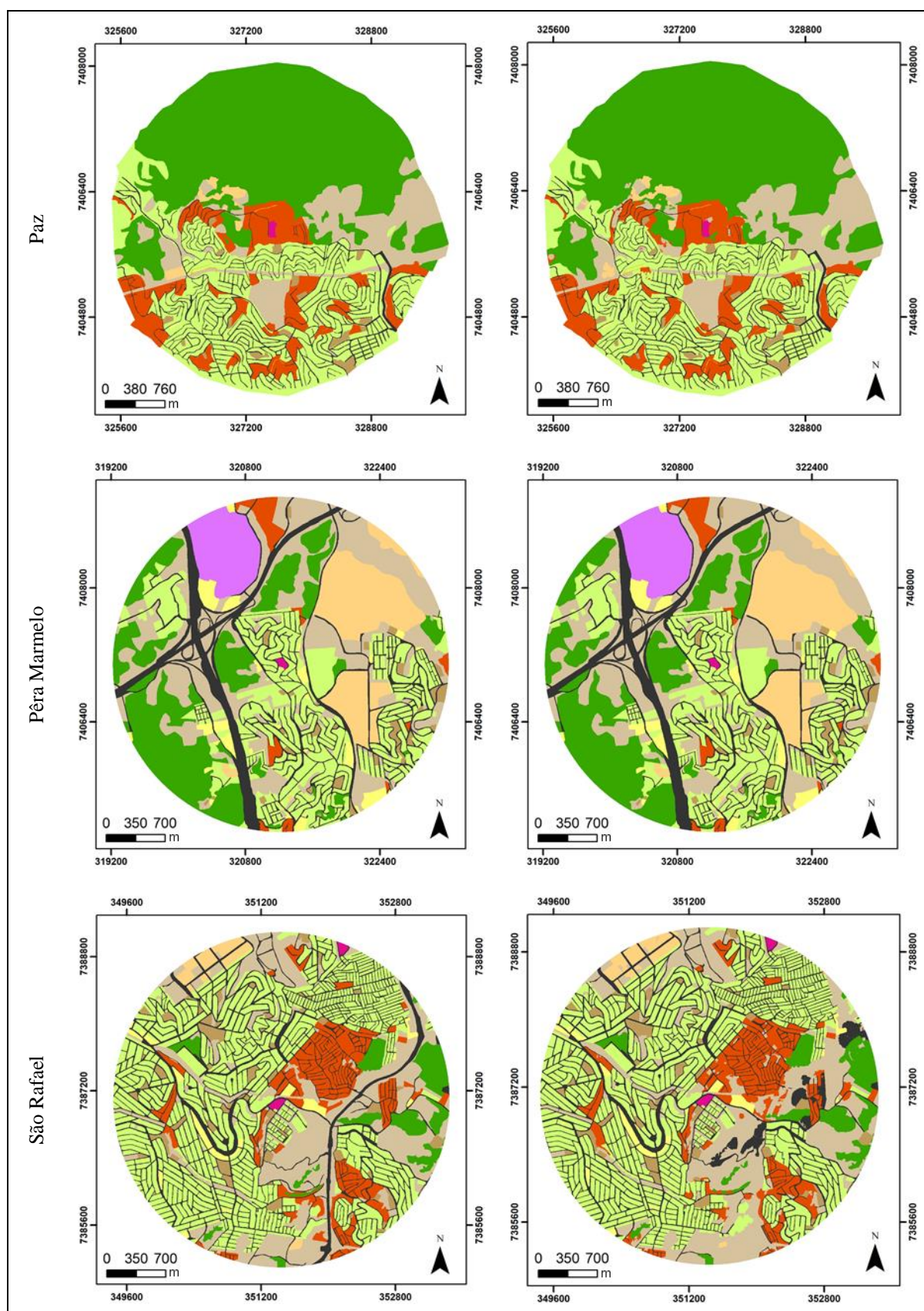
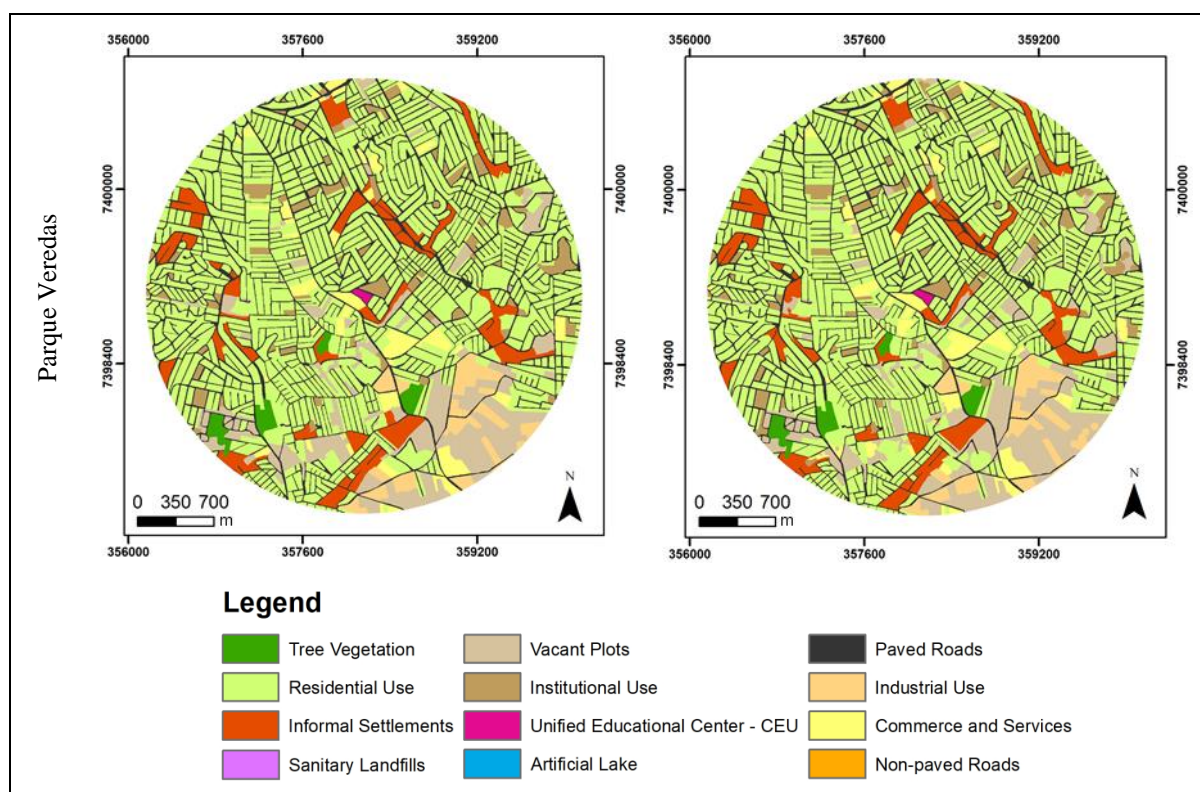


Figure S2. Simulated and observed land use/land cover maps for the year 2010.









Supplementary Material: Synthesis Tables

Table S11. Percentage of transitions to informal settlements in the 1st simulation period for all CEUs.

Models	0 – 500 m		501 – 1000 m		1001 – 1500 m		1501 – 2000 m	
	Area	Nº of Patches	Area	Nº of Patches	Area	Nº of Patches	Area	Nº of Patches
CEU Alvarenga*	-	-	-	-	-	-	-	-
CEU Butantã	23.7%	50.0%	0.0%	0.0%	0.0%	0.0%	76.3%	50.0%
CEU Campo Limpo	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%
CEU Feição da Vila	0.0%	0.0%	4.9%	33.3%	54.7%	41.7%	40.4%	25.0%
CEU Inácio Monteiro	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
CEU Navegantes	82.3%	33.3%	17.7%	66.7%	0.0%	0.0%	0.0%	0.0%
CEU Pêra Mar-melo	0.0%	0.0%	0.0%	0.0%	0.4%	73.7%	99.6%	26.3%
CEU São Rafael	16.4%	7.7%	15.3%	23.1%	53.7%	30.8%	14.5%	38.5%
CEU Parque Veredas	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%
CEU Paz	55.1%	58.3%	5.4%	8.3%	31.2%	16.7%	8.3%	16.7%

* No transition of this type occurred in the catchment area of this CEU.

Table S12. Percentage of transitions to informal settlements in the 2nd simulation period for all CEUs.

Models	0 – 500 m		501 – 1000 m		1001 – 1500 m		1501 – 2000 m	
	Area	Nº of Patches	Area	Nº of Patches	Area	Nº of Patches	Area	Nº of Patches
CEU Alvarenga	22.3%	11.8%	0.0%	0.0%	51.8%	58.8%	25.9%	29.4%
CEU Butantã	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
CEU Campo Limpo	0.0%	0.0%	0.0%	0.0%	14.0%	23.1%	86.0%	76.9%
CEU Feitiço da Vila*	-	-	-	-	-	-	-	-
CEU Inácio Monteiro	82.6%	88.9%	17.4%	11.1%	0.0%	0.0%	0.0%	0.0%
CEU Navegantes	0.0%	0.0%	0.0%	0.0%	60.0%	16.7%	40.0%	83.3%
CEU Pêra Marmelo	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
CEU São Rafael	37.3%	24.3%	25.5%	24.3%	28.4%	43.2%	8.9%	8.1%
CEU Parque Veredas	12.1%	21.4%	4.7%	14.3%	72.9%	57.1%	10.3%	7.1%
CEU Paz	72.6%	55.2%	27.4%	44.8%	0.0%	0.0%	0.0%	0.0%

* No transition of this type occurred in the catchment area of this CEU.

Table S13. Percentage of informal settlements removal or urbanization (regularization) in the 1st simulation period for all CEUs.

Models	0 – 500 m		501 – 1000 m		1001 – 1500 m		1501 – 2000 m	
	Area	Nº of Patches	Area	Nº of Patches	Area	Nº of Patches	Area	Nº of Patches
CEU Alvarenga*	-	-	-	-	-	-	-	-
CEU Butantã	0.0%	0.0%	0.3%	14.3%	0.0%	0.0%	99.7%	85.7%
CEU Campo Limpo*	-	-	-	-	-	-	-	-
CEU Feitiço da Vila	0.0%	0.0%	59.0%	70.0%	41.0%	30.0%	0.0%	0.0%
CEU Inácio Monteiro*	-	-	-	-	-	-	-	-
CEU Navegantes*	-	-	-	-	-	-	-	-
CEU Pêra Marmelo	71.2%	11.1%	19.1%	11.1%	9.8%	77.8%	0.0%	0.0%
CEU São Rafael*	-	-	-	-	-	-	-	-
CEU Parque Veredas	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%
CEU Paz	0.0%	0.0%	0.0%	0.0%	79.9%	71.4%	20.1%	28.6%

Informal Settlements removal concerns the transition to Vacant Plots.

Informal Settlements regularization or formalization concerns to formal Residential Use.

* No transition of this type occurred in the catchment area of this CEU.

Table S14. Percentage of informal settlements removal or urbanization (regularization) in the 2nd simulation period for all CEUs.

Models	0 – 500 m		501 – 1000 m		1001 – 1500 m		1501 – 2000 m	
	Area	Nº of Patches	Area	Nº of Patches	Area	Nº of Patches	Area	Nº of Patches
CEU Alvarenga*	-	-	-	-	-	-	-	-
CEU Butantã	40.9%	83.3%	0.1%	8.3%	59.0%	8.3%	0.0%	0.0%
CEU Campo Limpo	0.0%	0.0%	66.5%	13.3%	33.5%	86.7%	0.0%	0.0%
CEU Feição da Vila	0.0%	0.0%	53.6%	31.4%	41.0%	64.7%	5.5%	3.9%
CEU Inácio Monteiro	23.3%	14.8%	26.9%	11.1%	4.3%	37.0%	45.4%	37.0%
CEU Navegantes	26.6%	45.5%	40.1%	36.4%	33.3%	18.2%	0.0%	0.0%
CEU Pêra Marmelo	0.0%	0.0%	0.0%	0.0%	42.4%	54.8%	57.6%	45.2%
CEU São Rafael	0.0%	0.0%	56.5%	50.0%	43.5%	50.0%	0.0%	0.0%
CEU Parque Veredas	0.0%	0.0%	0.0%	0.0%	51.9%	73.3%	48.1%	26.7%
CEU Paz	0.0%	0.0%	41.6%	36.4%	49.3%	54.5%	9.1%	9.1%

Informal Settlements removal concerns the transition to Vacant Plots.

Informal Settlements regularization or formalization concerns to formal Residential Use.

* No transition of this type occurred in the catchment area of this CEU.

Table S15. Percentage of transitions to the formal residential use in the 1st simulation period for all CEUs.

Models	0 – 500 m		501 – 1000 m		1001 – 1500 m		1501 – 2000 m	
	Area	Nº of Patches	Area	Nº of Patches	Área	Area	Nº of Patches	Area
CEU Alvarenga	0.0%	0.0%	9.2%	33.3%	90.8%	66.7%	0.0%	0.0%
CEU Butantã	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%
CEU Campo Limpo	0.2%	12.5%	24.5%	37.5%	0.0%	0.0%	75.3%	50.0%
CEU Feição da Vila	37.4%	20.0%	62.6%	80.0%	0.0%	0.0%	0.0%	0.0%
CEU Inácio Monteiro	0.0%	0.0%	23.6%	11.8%	41.4%	35.3%	35.0%	52.9%
CEU Navegantes*	-	-	-	-	-	-	-	-
CEU Pêra Marmelo	32.8%	10.0%	29.9%	20.0%	21.8%	45.0%	15.4%	25.0%
CEU São Rafael	0.0%	0.0%	3.3%	16.7%	96.7%	83.3%	0.0%	0.0%
CEU Parque Veredas	22.3%	17.6%	51.2%	52.9%	26.5%	29.4%	0.0%	0.0%
CEU Paz	0.0%	0.0%	0.0%	0.0%	79.9%	71.4%	20.1%	28.6%

* No transition of this type occurred in the catchment area of this CEU.

Table S16. Percentage of transitions to the formal residential use in the 2nd simulation period for all CEUs.

Models	0 – 500 m		501 – 1000 m		1001 – 1500 m		1501 – 2000 m	
	Area	Nº of Patches	Area	Nº of Patches	Área	Area	Nº of Patches	Area
CEU Alvarenga	0.0%	0.0%	0.0%	0.0%	96.8%	71.4%	3.2%	28.6%
CEU Butantã	9.6%	10.7%	19.0%	10.7%	54.0%	60.7%	17.4%	17.9%
CEU Campo Limpo	3.1%	6.7%	29.6%	26.7%	8.5%	26.7%	58.8%	40.0%
CEU Feitiço da Vila	9.0%	14.3%	57.2%	42.9%	28.7%	28.6%	5.1%	14.3%
CEU Inácio Monteiro	9.0%	8.3%	9.0%	11.1%	23.3%	22.2%	58.7%	58.3%
CEU Navegantes	0.0%	0.0%	36.4%	14.3%	63.6%	85.7%	0.0%	0.0%
CEU Pêra Mar-melo	62.0%	40.0%	6.9%	20.0%	15.7%	26.7%	15.4%	13.3%
CEU São Rafael	3.4%	13.3%	49.1%	46.7%	30.2%	33.3%	17.3%	6.7%
CEU Parque Veredas	0.0%	0.0%	44.8%	23.8%	45.6%	61.9%	9.6%	14.3%
CEU Paz	0.0%	0.0%	39.6%	33.3%	2.0%	33.3%	58.4%	33.3%