

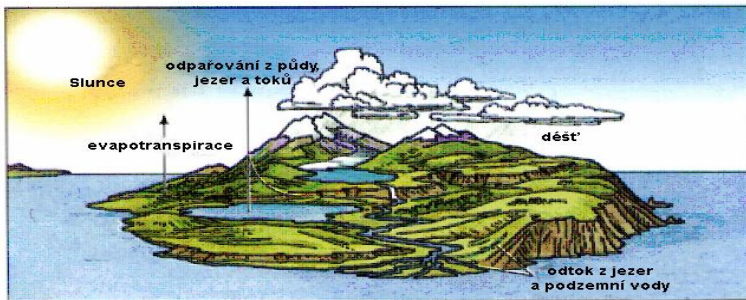
Dynamika systému ostrova - voda

(detailní popis viz samostatný text)

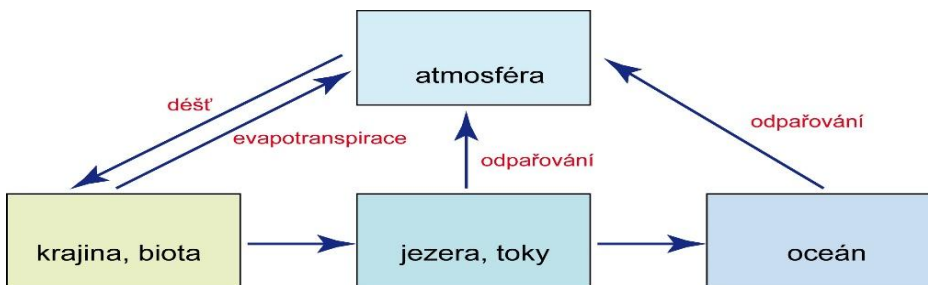
Systém barevného značení buněk

- buňky s naměřenými hodnotami
- buňky, které obsahují hodnoty vypočítané z naměřených hodnot
- buňky, do kterých se zadávají hodnoty pro simulaci

System



"Box" model



Naměřené hodnoty nebo jejich odhady

Obsahy rezervoárů

rezervoár	označení	obsah tun
atmosféra	A	5
krajina	K	6
jezera	J	0.2
oceán	O	30000
celkem		30011.2

Toky

tok	tun/den
$j_{AK} =$	0.50
$j_{KA} =$	0.60
$j_{KJ} =$	0.30
$j_{JA} =$	0.05
$j_{JO} =$	0.10
$j_{OA} =$	0.50

Látková bilance rezervoárů v době měření

Toky vzhledem k rezervoárům

	z rezervoáru t/den	do rezervoáru t/den	rozdíl t/den
atmosféra	0.50	1.15	0.65
krajina	0.90	0.50	-0.40
jezera	0.15	0.30	0.15
oceán	0.50	0.10	-0.40

Doby zdržení

$\tau = m_x / \sum j_z$

z toků z den
10
6.7
1.3
60000

Změny obsahu vody v rezervoárech

$$\Delta m_A / \Delta t = k_{K-A} \times m_K - k_{A-K} \times m_A + j_{JA} + j_{OA}$$

$$\Delta m_K / \Delta t = k_{A-K} \times m_A - k_{K-A} \times m_K - k_{K-J} \times m_K$$

$$\Delta m_J / \Delta t = k_{K-J} \times m_K - k_{J-O} \times m_J - j_{JA}$$

$$\Delta m_O / \Delta t = k_{J-O} \times m_J - j_{OA}$$

Okamžitá bilance

0.65

-0.40

0.15

-0.40

Stacionární stavy – výrazy

$$m_{As} \quad 0 = k_{K-A} \times m_{Ks} - k_{A-K} \times m_{As} + j_{JA} + j_{OA}$$

$$m_{Ks} \quad 0 = k_{A-K} \times m_{As} - k_{K-A} \times m_{Ks} - k_{K-J} \times m_{Ks}$$

$$m_{Js} \quad 0 = k_{K-J} \times m_{Ks} - k_{J-O} \times m_{Js} - j_{JA}$$

$$m_{Os} \quad 0 = k_{J-O} \times m_{Js} - j_{OA}$$

Stacionární stavy

$$m_{As} = (k_{K-A} + k_{A-K}) \times m_{Ks} - j_{JA} - j_{OA}$$

$$m_{Ks} = (k_{J-O} \times m_{Js} + j_{JA}) / (k_{A-K} - k_{K-A} - k_{K-J})$$

$$m_{Js} = j_{OA} / k_{J-O}$$

$$\Delta m_{Os} = (m_{As} - m_{Os}) \times r$$

Stacionární stavy – hodnoty

	Obsah m	Toky za stac. stavu j	Doba zdržení τ
$m_{As} =$	16.5	1.65	10
$m_{Ks} =$	11	0.55	20
$m_{Js} =$	1	0.5	2
$m_{Os} =$	30017.3	0.5	60034.6

$$\Delta m_{Os} =$$

Numerická simulace

$$t_1 = t_0 + \Delta t$$

$$m_{A1} = m_{A0} + \Delta m_{A0} \quad \Delta m_A = (k_{K-A} \times m_K - k_{A-K} \times m_A + j_{JA} + j_{OA}) \times \Delta t$$

$$m_{K1} = m_{K0} + \Delta m_{K0} \quad \Delta m_K = (k_{A-K} \times m_A - k_{K-A} \times m_K - k_{K-J} \times m_K) \times \Delta t$$

$$m_{J1} = m_{J0} + \Delta m_{J0} \quad \Delta m_J = (k_{K-J} \times m_K - k_{J-O} \times m_J - j_{JA}) \times \Delta t$$

$$m_{O1} = m_{O0} + \Delta m_{O0} \quad \Delta m_O = (k_{J-O} \times m_J - j_{OA}) \times \Delta t$$

Výchozí a konečné hodnoty simulace

Do buněk okrové barvy se zadávají výchozí hodnoty pro simulaci (obsahy rezervoárů, časový obsah oceánu je automaticky vypočítán (celkové množství vody v systému je konstantní) nek. Aby nebylo nutné zjišťovat konečné hodnoty rolváním v tabulce, jsou v buňkách konečného

Zadání počátečních stavů:

atmosféra	5
krajina	6
jezera	0.2
oceán	30000

Konečný stav

16.384
10.909
0.990
29982.92

Vychýlení po 5

$$\Delta m_A =$$

$$\Delta m_K =$$

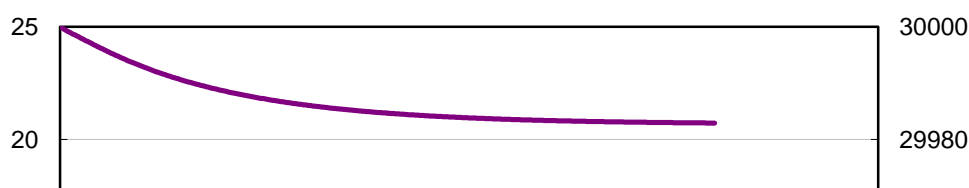
Vychýlení po 1

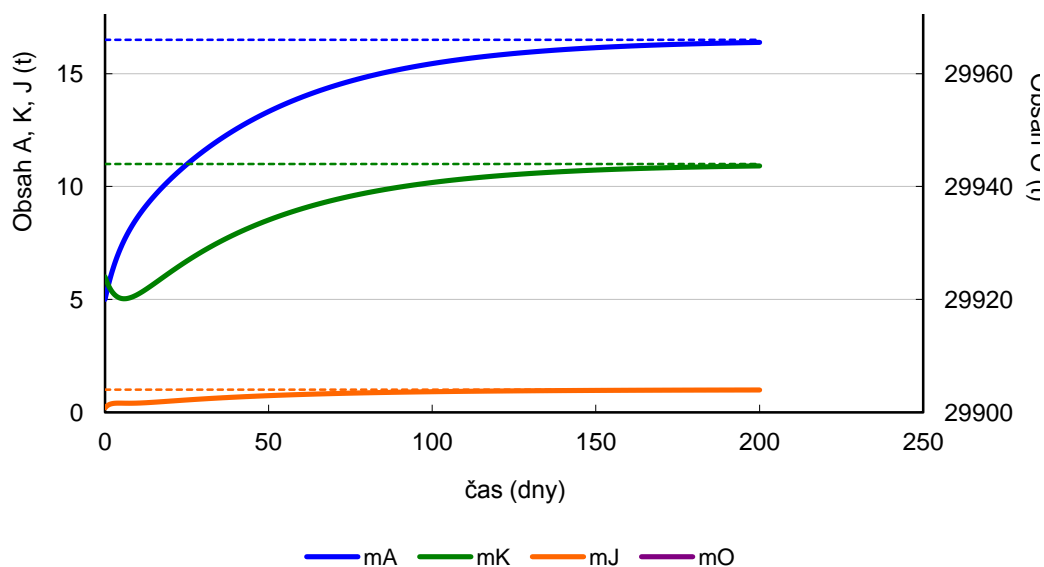
$$\Delta m_A =$$

$$\Delta m_K =$$

$$\Delta t = 0.5$$

$$\text{konec} = 200 \text{ dnů}$$





Vlastní simulace (401 kroků)

t	m_A	Δm_A	m_K	Δm_K	m_J
dny	t	t	t	t	t
0.0	5.000		0.325	6.000	-0.200
0.5	5.325		0.299	5.800	-0.169
1.0	5.624		0.275	5.631	-0.141
1.5	5.899		0.255	5.490	-0.117
2.0	6.154		0.236	5.373	-0.095
2.5	6.390		0.219	5.278	-0.076
3.0	6.609		0.205	5.202	-0.060
3.5	6.814		0.191	5.142	-0.045
4.0	7.005		0.180	5.097	-0.032
4.5	7.185		0.169	5.065	-0.021
5.0	7.354		0.160	5.044	-0.011
5.5	7.513		0.151	5.034	-0.002
6.0	7.664		0.143	5.032	0.006
6.5	7.808		0.137	5.038	0.013
7.0	7.944		0.130	5.050	0.018
7.5	8.074		0.125	5.069	0.024
8.0	8.199		0.120	5.092	0.028
8.5	8.319		0.115	5.120	0.032
9.0	8.434		0.111	5.152	0.035
9.5	8.545		0.107	5.187	0.038
10.0	8.652		0.104	5.226	0.041
10.5	8.756		0.101	5.266	0.043
11.0	8.856		0.098	5.309	0.045
11.5	8.954		0.095	5.354	0.046
12.0	9.049		0.093	5.400	0.047
12.5	9.141		0.090	5.447	0.049
13.0	9.232		0.088	5.496	0.049
13.5	9.320		0.086	5.545	0.050
14.0	9.406		0.084	5.595	0.051
14.5	9.491		0.083	5.646	0.051
15.0	9.573		0.081	5.697	0.051
15.5	9.655		0.080	5.748	0.052
16.0	9.734		0.078	5.800	0.052
16.5	9.813		0.077	5.852	0.052

17.0	9.890	0.076	5.904	0.052	0.470
17.5	9.965	0.075	5.955	0.052	0.475
18.0	10.040	0.073	6.007	0.051	0.480
18.5	10.113	0.072	6.058	0.051	0.485
19.0	10.185	0.071	6.110	0.051	0.490
19.5	10.257	0.070	6.161	0.051	0.496
20.0	10.327	0.069	6.211	0.050	0.501
20.5	10.396	0.068	6.262	0.050	0.506
21.0	10.464	0.067	6.312	0.050	0.511
21.5	10.532	0.067	6.362	0.049	0.516
22.0	10.598	0.066	6.411	0.049	0.521
22.5	10.664	0.065	6.460	0.049	0.526
23.0	10.729	0.064	6.509	0.048	0.531
23.5	10.793	0.063	6.557	0.048	0.536
24.0	10.856	0.062	6.605	0.047	0.541
24.5	10.918	0.062	6.653	0.047	0.546
25.0	10.980	0.061	6.700	0.047	0.551
25.5	11.041	0.060	6.746	0.046	0.556
26.0	11.101	0.060	6.792	0.046	0.560
26.5	11.161	0.059	6.838	0.045	0.565
27.0	11.220	0.058	6.883	0.045	0.570
27.5	11.278	0.057	6.928	0.044	0.574
28.0	11.335	0.057	6.972	0.044	0.579
28.5	11.392	0.056	7.016	0.043	0.584
29.0	11.448	0.056	7.059	0.043	0.588
29.5	11.504	0.055	7.102	0.043	0.593
30.0	11.559	0.054	7.145	0.042	0.597
30.5	11.613	0.054	7.187	0.042	0.601
31.0	11.667	0.053	7.229	0.041	0.606
31.5	11.720	0.052	7.270	0.041	0.610
32.0	11.772	0.052	7.311	0.040	0.614
32.5	11.824	0.051	7.351	0.040	0.618
33.0	11.876	0.051	7.391	0.039	0.623
33.5	11.926	0.050	7.430	0.039	0.627
34.0	11.977	0.050	7.469	0.039	0.631
34.5	12.026	0.049	7.508	0.038	0.635
35.0	12.075	0.049	7.546	0.038	0.639
35.5	12.124	0.048	7.584	0.037	0.643
36.0	12.172	0.047	7.621	0.037	0.647
36.5	12.219	0.047	7.658	0.037	0.651
37.0	12.266	0.046	7.695	0.036	0.654
37.5	12.313	0.046	7.731	0.036	0.658
38.0	12.359	0.045	7.767	0.035	0.662
38.5	12.404	0.045	7.802	0.035	0.666
39.0	12.449	0.044	7.837	0.035	0.669
39.5	12.493	0.044	7.872	0.034	0.673
40.0	12.537	0.043	7.906	0.034	0.676
40.5	12.581	0.043	7.940	0.034	0.680
41.0	12.624	0.042	7.974	0.033	0.684
41.5	12.666	0.042	8.007	0.033	0.687
42.0	12.708	0.042	8.040	0.032	0.690
42.5	12.750	0.041	8.072	0.032	0.694
43.0	12.791	0.041	8.104	0.032	0.697
43.5	12.832	0.040	8.136	0.031	0.700
44.0	12.872	0.040	8.167	0.031	0.704
44.5	12.912	0.039	8.198	0.031	0.707

45.0	12.951	0.039	8.229	0.030	0.710
45.5	12.990	0.038	8.259	0.030	0.713
46.0	13.028	0.038	8.289	0.030	0.717
46.5	13.066	0.038	8.319	0.029	0.720
47.0	13.104	0.037	8.349	0.029	0.723
47.5	13.141	0.037	8.378	0.029	0.726
48.0	13.178	0.036	8.406	0.028	0.729
48.5	13.214	0.036	8.435	0.028	0.732
49.0	13.250	0.036	8.463	0.028	0.735
49.5	13.286	0.035	8.491	0.028	0.738
50.0	13.321	0.035	8.518	0.027	0.740
50.5	13.356	0.034	8.545	0.027	0.743
51.0	13.391	0.034	8.572	0.027	0.746
51.5	13.425	0.034	8.599	0.026	0.749
52.0	13.458	0.033	8.625	0.026	0.752
52.5	13.492	0.033	8.651	0.026	0.754
53.0	13.525	0.033	8.677	0.025	0.757
53.5	13.557	0.032	8.702	0.025	0.760
54.0	13.590	0.032	8.728	0.025	0.762
54.5	13.622	0.032	8.753	0.025	0.765
55.0	13.653	0.031	8.777	0.024	0.768
55.5	13.684	0.031	8.802	0.024	0.770
56.0	13.715	0.031	8.826	0.024	0.773
56.5	13.746	0.030	8.849	0.024	0.775
57.0	13.776	0.030	8.873	0.023	0.778
57.5	13.806	0.030	8.896	0.023	0.780
58.0	13.835	0.029	8.919	0.023	0.782
58.5	13.864	0.029	8.942	0.023	0.785
59.0	13.893	0.029	8.965	0.022	0.787
59.5	13.922	0.028	8.987	0.022	0.789
60.0	13.950	0.028	9.009	0.022	0.792
60.5	13.978	0.028	9.031	0.022	0.794
61.0	14.006	0.027	9.053	0.021	0.796
61.5	14.033	0.027	9.074	0.021	0.799
62.0	14.060	0.027	9.095	0.021	0.801
62.5	14.087	0.026	9.116	0.021	0.803
63.0	14.113	0.026	9.137	0.020	0.805
63.5	14.140	0.026	9.157	0.020	0.807
64.0	14.165	0.026	9.177	0.020	0.809
64.5	14.191	0.025	9.197	0.020	0.811
65.0	14.216	0.025	9.217	0.020	0.814
65.5	14.241	0.025	9.236	0.019	0.816
66.0	14.266	0.024	9.256	0.019	0.818
66.5	14.291	0.024	9.275	0.019	0.820
67.0	14.315	0.024	9.294	0.019	0.822
67.5	14.339	0.024	9.313	0.018	0.824
68.0	14.362	0.023	9.331	0.018	0.825
68.5	14.386	0.023	9.349	0.018	0.827
69.0	14.409	0.023	9.367	0.018	0.829
69.5	14.432	0.023	9.385	0.018	0.831
70.0	14.455	0.022	9.403	0.018	0.833
70.5	14.477	0.022	9.421	0.017	0.835
71.0	14.499	0.022	9.438	0.017	0.837
71.5	14.521	0.022	9.455	0.017	0.838
72.0	14.543	0.021	9.472	0.017	0.840
72.5	14.564	0.021	9.489	0.017	0.842

73.0	14.585	0.021	9.505	0.016	0.844
73.5	14.606	0.021	9.522	0.016	0.845
74.0	14.627	0.021	9.538	0.016	0.847
74.5	14.648	0.020	9.554	0.016	0.849
75.0	14.668	0.020	9.570	0.016	0.850
75.5	14.688	0.020	9.585	0.016	0.852
76.0	14.708	0.020	9.601	0.015	0.854
76.5	14.728	0.019	9.616	0.015	0.855
77.0	14.747	0.019	9.631	0.015	0.857
77.5	14.766	0.019	9.646	0.015	0.858
78.0	14.785	0.019	9.661	0.015	0.860
78.5	14.804	0.019	9.676	0.015	0.862
79.0	14.823	0.018	9.690	0.014	0.863
79.5	14.841	0.018	9.705	0.014	0.865
80.0	14.859	0.018	9.719	0.014	0.866
80.5	14.877	0.018	9.733	0.014	0.867
81.0	14.895	0.018	9.747	0.014	0.869
81.5	14.913	0.017	9.761	0.014	0.870
82.0	14.930	0.017	9.774	0.013	0.872
82.5	14.947	0.017	9.788	0.013	0.873
83.0	14.964	0.017	9.801	0.013	0.875
83.5	14.981	0.017	9.814	0.013	0.876
84.0	14.998	0.016	9.827	0.013	0.877
84.5	15.014	0.016	9.840	0.013	0.879
85.0	15.030	0.016	9.853	0.013	0.880
85.5	15.047	0.016	9.865	0.012	0.881
86.0	15.063	0.016	9.878	0.012	0.883
86.5	15.078	0.016	9.890	0.012	0.884
87.0	15.094	0.015	9.902	0.012	0.885
87.5	15.109	0.015	9.914	0.012	0.886
88.0	15.125	0.015	9.926	0.012	0.888
88.5	15.140	0.015	9.938	0.012	0.889
89.0	15.155	0.015	9.949	0.012	0.890
89.5	15.169	0.015	9.961	0.011	0.891
90.0	15.184	0.014	9.972	0.011	0.893
90.5	15.198	0.014	9.984	0.011	0.894
91.0	15.213	0.014	9.995	0.011	0.895
91.5	15.227	0.014	10.006	0.011	0.896
92.0	15.241	0.014	10.017	0.011	0.897
92.5	15.254	0.014	10.027	0.011	0.898
93.0	15.268	0.014	10.038	0.011	0.899
93.5	15.282	0.013	10.049	0.010	0.901
94.0	15.295	0.013	10.059	0.010	0.902
94.5	15.308	0.013	10.069	0.010	0.903
95.0	15.321	0.013	10.080	0.010	0.904
95.5	15.334	0.013	10.090	0.010	0.905
96.0	15.347	0.013	10.100	0.010	0.906
96.5	15.360	0.013	10.110	0.010	0.907
97.0	15.372	0.012	10.119	0.010	0.908
97.5	15.384	0.012	10.129	0.010	0.909
98.0	15.397	0.012	10.139	0.009	0.910
98.5	15.409	0.012	10.148	0.009	0.911
99.0	15.421	0.012	10.157	0.009	0.912
99.5	15.433	0.012	10.167	0.009	0.913
100.0	15.444	0.012	10.176	0.009	0.914
100.5	15.456	0.011	10.185	0.009	0.915

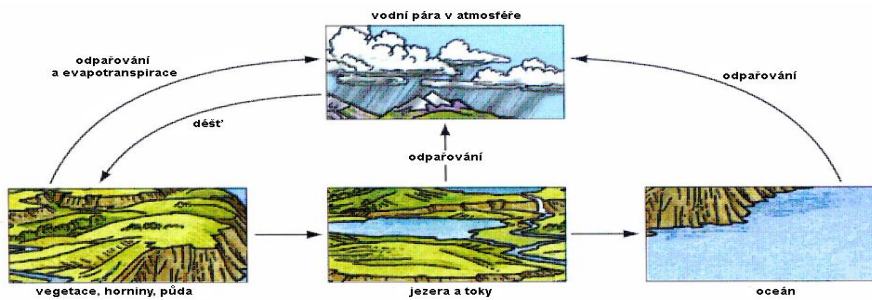
101.0	15.467	0.011	10.194	0.009	0.916
101.5	15.479	0.011	10.202	0.009	0.917
102.0	15.490	0.011	10.211	0.009	0.918
102.5	15.501	0.011	10.220	0.009	0.918
103.0	15.512	0.011	10.228	0.008	0.919
103.5	15.523	0.011	10.237	0.008	0.920
104.0	15.533	0.011	10.245	0.008	0.921
104.5	15.544	0.010	10.254	0.008	0.922
105.0	15.554	0.010	10.262	0.008	0.923
105.5	15.565	0.010	10.270	0.008	0.924
106.0	15.575	0.010	10.278	0.008	0.924
106.5	15.585	0.010	10.286	0.008	0.925
107.0	15.595	0.010	10.294	0.008	0.926
107.5	15.605	0.010	10.301	0.008	0.927
108.0	15.615	0.010	10.309	0.008	0.928
108.5	15.625	0.010	10.317	0.007	0.929
109.0	15.634	0.009	10.324	0.007	0.929
109.5	15.644	0.009	10.331	0.007	0.930
110.0	15.653	0.009	10.339	0.007	0.931
110.5	15.662	0.009	10.346	0.007	0.932
111.0	15.672	0.009	10.353	0.007	0.932
111.5	15.681	0.009	10.360	0.007	0.933
112.0	15.690	0.009	10.367	0.007	0.934
112.5	15.698	0.009	10.374	0.007	0.935
113.0	15.707	0.009	10.381	0.007	0.935
113.5	15.716	0.009	10.388	0.007	0.936
114.0	15.725	0.008	10.395	0.007	0.937
114.5	15.733	0.008	10.401	0.007	0.937
115.0	15.741	0.008	10.408	0.006	0.938
115.5	15.750	0.008	10.414	0.006	0.939
116.0	15.758	0.008	10.421	0.006	0.939
116.5	15.766	0.008	10.427	0.006	0.940
117.0	15.774	0.008	10.433	0.006	0.941
117.5	15.782	0.008	10.440	0.006	0.941
118.0	15.790	0.008	10.446	0.006	0.942
118.5	15.798	0.008	10.452	0.006	0.943
119.0	15.805	0.008	10.458	0.006	0.943
119.5	15.813	0.008	10.464	0.006	0.944
120.0	15.821	0.007	10.470	0.006	0.945
120.5	15.828	0.007	10.475	0.006	0.945
121.0	15.835	0.007	10.481	0.006	0.946
121.5	15.843	0.007	10.487	0.006	0.946
122.0	15.850	0.007	10.492	0.006	0.947
122.5	15.857	0.007	10.498	0.006	0.947
123.0	15.864	0.007	10.504	0.005	0.948
123.5	15.871	0.007	10.509	0.005	0.949
124.0	15.878	0.007	10.514	0.005	0.949
124.5	15.885	0.007	10.520	0.005	0.950
125.0	15.892	0.007	10.525	0.005	0.950
125.5	15.898	0.007	10.530	0.005	0.951
126.0	15.905	0.007	10.535	0.005	0.951
126.5	15.911	0.006	10.540	0.005	0.952
127.0	15.918	0.006	10.545	0.005	0.952
127.5	15.924	0.006	10.550	0.005	0.953
128.0	15.930	0.006	10.555	0.005	0.953
128.5	15.937	0.006	10.560	0.005	0.954

129.0	15.943	0.006	10.565	0.005	0.955
129.5	15.949	0.006	10.570	0.005	0.955
130.0	15.955	0.006	10.574	0.005	0.955
130.5	15.961	0.006	10.579	0.005	0.956
131.0	15.967	0.006	10.584	0.005	0.956
131.5	15.973	0.006	10.588	0.005	0.957
132.0	15.979	0.006	10.593	0.004	0.957
132.5	15.984	0.006	10.597	0.004	0.958
133.0	15.990	0.006	10.602	0.004	0.958
133.5	15.995	0.006	10.606	0.004	0.959
134.0	16.001	0.005	10.610	0.004	0.959
134.5	16.006	0.005	10.615	0.004	0.960
135.0	16.012	0.005	10.619	0.004	0.960
135.5	16.017	0.005	10.623	0.004	0.961
136.0	16.023	0.005	10.627	0.004	0.961
136.5	16.028	0.005	10.631	0.004	0.961
137.0	16.033	0.005	10.635	0.004	0.962
137.5	16.038	0.005	10.639	0.004	0.962
138.0	16.043	0.005	10.643	0.004	0.963
138.5	16.048	0.005	10.647	0.004	0.963
139.0	16.053	0.005	10.651	0.004	0.964
139.5	16.058	0.005	10.655	0.004	0.964
140.0	16.063	0.005	10.659	0.004	0.964
140.5	16.068	0.005	10.662	0.004	0.965
141.0	16.072	0.005	10.666	0.004	0.965
141.5	16.077	0.005	10.670	0.004	0.965
142.0	16.082	0.005	10.673	0.004	0.966
142.5	16.086	0.005	10.677	0.004	0.966
143.0	16.091	0.004	10.681	0.004	0.967
143.5	16.095	0.004	10.684	0.003	0.967
144.0	16.100	0.004	10.687	0.003	0.967
144.5	16.104	0.004	10.691	0.003	0.968
145.0	16.108	0.004	10.694	0.003	0.968
145.5	16.113	0.004	10.698	0.003	0.968
146.0	16.117	0.004	10.701	0.003	0.969
146.5	16.121	0.004	10.704	0.003	0.969
147.0	16.125	0.004	10.707	0.003	0.969
147.5	16.129	0.004	10.711	0.003	0.970
148.0	16.134	0.004	10.714	0.003	0.970
148.5	16.138	0.004	10.717	0.003	0.970
149.0	16.142	0.004	10.720	0.003	0.971
149.5	16.145	0.004	10.723	0.003	0.971
150.0	16.149	0.004	10.726	0.003	0.971
150.5	16.153	0.004	10.729	0.003	0.972
151.0	16.157	0.004	10.732	0.003	0.972
151.5	16.161	0.004	10.735	0.003	0.972
152.0	16.164	0.004	10.738	0.003	0.973
152.5	16.168	0.004	10.741	0.003	0.973
153.0	16.172	0.004	10.744	0.003	0.973
153.5	16.175	0.004	10.747	0.003	0.973
154.0	16.179	0.004	10.749	0.003	0.974
154.5	16.182	0.003	10.752	0.003	0.974
155.0	16.186	0.003	10.755	0.003	0.974
155.5	16.189	0.003	10.757	0.003	0.975
156.0	16.193	0.003	10.760	0.003	0.975
156.5	16.196	0.003	10.763	0.003	0.975

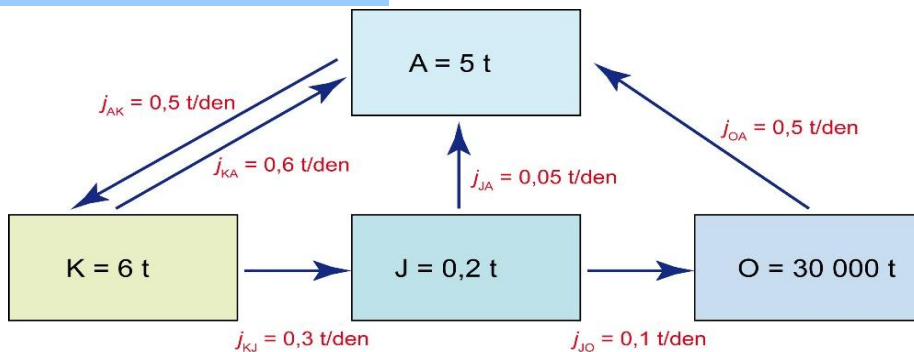
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157.5	16.203	0.003	10.768	0.003	0.976
158.0	16.206	0.003	10.770	0.003	0.976
158.5	16.209	0.003	10.773	0.002	0.976
159.0	16.212	0.003	10.775	0.002	0.977
159.5	16.216	0.003	10.778	0.002	0.977
160.0	16.219	0.003	10.780	0.002	0.977
160.5	16.222	0.003	10.783	0.002	0.977
161.0	16.225	0.003	10.785	0.002	0.978
161.5	16.228	0.003	10.788	0.002	0.978
162.0	16.231	0.003	10.790	0.002	0.978
162.5	16.234	0.003	10.792	0.002	0.978
163.0	16.237	0.003	10.794	0.002	0.978
163.5	16.240	0.003	10.797	0.002	0.979
164.0	16.242	0.003	10.799	0.002	0.979
164.5	16.245	0.003	10.801	0.002	0.979
165.0	16.248	0.003	10.803	0.002	0.979
165.5	16.251	0.003	10.805	0.002	0.980
166.0	16.254	0.003	10.808	0.002	0.980
166.5	16.256	0.003	10.810	0.002	0.980
167.0	16.259	0.003	10.812	0.002	0.980
167.5	16.262	0.003	10.814	0.002	0.981
168.0	16.264	0.003	10.816	0.002	0.981
168.5	16.267	0.003	10.818	0.002	0.981
169.0	16.269	0.003	10.820	0.002	0.981
169.5	16.272	0.003	10.822	0.002	0.981
170.0	16.274	0.002	10.824	0.002	0.982
170.5	16.277	0.002	10.826	0.002	0.982
171.0	16.279	0.002	10.828	0.002	0.982
171.5	16.282	0.002	10.830	0.002	0.982
172.0	16.284	0.002	10.831	0.002	0.982
172.5	16.286	0.002	10.833	0.002	0.983
173.0	16.289	0.002	10.835	0.002	0.983
173.5	16.291	0.002	10.837	0.002	0.983
174.0	16.293	0.002	10.839	0.002	0.983
174.5	16.296	0.002	10.840	0.002	0.983
175.0	16.298	0.002	10.842	0.002	0.983
175.5	16.300	0.002	10.844	0.002	0.984
176.0	16.302	0.002	10.846	0.002	0.984
176.5	16.304	0.002	10.847	0.002	0.984
177.0	16.307	0.002	10.849	0.002	0.984
177.5	16.309	0.002	10.851	0.002	0.984
178.0	16.311	0.002	10.852	0.002	0.985
178.5	16.313	0.002	10.854	0.002	0.985
179.0	16.315	0.002	10.856	0.002	0.985
179.5	16.317	0.002	10.857	0.002	0.985
180.0	16.319	0.002	10.859	0.002	0.985
180.5	16.321	0.002	10.860	0.002	0.985
181.0	16.323	0.002	10.862	0.002	0.986
181.5	16.325	0.002	10.863	0.001	0.986
182.0	16.327	0.002	10.865	0.001	0.986
182.5	16.329	0.002	10.866	0.001	0.986
183.0	16.331	0.002	10.868	0.001	0.986
183.5	16.332	0.002	10.869	0.001	0.986
184.0	16.334	0.002	10.871	0.001	0.986
184.5	16.336	0.002	10.872	0.001	0.987

185.0	16.338	0.002	10.873	0.001	0.987
185.5	16.340	0.002	10.875	0.001	0.987
186.0	16.341	0.002	10.876	0.001	0.987
186.5	16.343	0.002	10.878	0.001	0.987
187.0	16.345	0.002	10.879	0.001	0.987
187.5	16.347	0.002	10.880	0.001	0.987
188.0	16.348	0.002	10.882	0.001	0.988
188.5	16.350	0.002	10.883	0.001	0.988
189.0	16.352	0.002	10.884	0.001	0.988
189.5	16.353	0.002	10.885	0.001	0.988
190.0	16.355	0.002	10.887	0.001	0.988
190.5	16.356	0.002	10.888	0.001	0.988
191.0	16.358	0.002	10.889	0.001	0.988
191.5	16.360	0.002	10.890	0.001	0.989
192.0	16.361	0.002	10.892	0.001	0.989
192.5	16.363	0.002	10.893	0.001	0.989
193.0	16.364	0.001	10.894	0.001	0.989
193.5	16.366	0.001	10.895	0.001	0.989
194.0	16.367	0.001	10.896	0.001	0.989
194.5	16.369	0.001	10.897	0.001	0.989
195.0	16.370	0.001	10.898	0.001	0.989
195.5	16.371	0.001	10.900	0.001	0.989
196.0	16.373	0.001	10.901	0.001	0.990
196.5	16.374	0.001	10.902	0.001	0.990
197.0	16.376	0.001	10.903	0.001	0.990
197.5	16.377	0.001	10.904	0.001	0.990
198.0	16.378	0.001	10.905	0.001	0.990
198.5	16.380	0.001	10.906	0.001	0.990
199.0	16.381	0.001	10.907	0.001	0.990
199.5	16.382	0.001	10.908	0.001	0.990
200.0	16.384		10.909		0.990

Rozdělení na rezervoáry



"Box" model s hodnotami



Rychlostní konstanty

$$j_{XY} = k_{XY} \times m_X \rightarrow k_{XY} = j_{XY} / m_X$$

konstanta	1/den
k_{AK}	0.10
k_{KA}	0.10
k_{KJ}	0.05
k_{JO}	0.50

$$\tau = m_X / \sum j_{do}$$

z toků do
den

4.3
12
0.7
300000

iv) – odvozené výrazy pro každý rezervoár

$$k_{K-J} \times m_{Ks} / k_{A-K}$$

$$i_{Js} + j_{JA}) / k_{K-J}$$

$$n_{As}) + (m_K - m_{Ks}) + (m_J - m_{Js})$$

-17.3

ř krok a případně výchýlení obsahu atmosféry a krajiny po 50 a 100 dnech)
o je možné zadat určitou hodnotu
stavu přečteny hodnoty posledních buněk simulace

0 dnech	
	0
	0
100 dnech	
	0
	0

Linie stacionárních stavů v grafu

	t	m
atmosféra	0	16.5
	200	16.5
krajina	0	11

	200	11
jezera	0	1
	200	1
oceán	0	30017.3
	200	30017.3



Δm_J	m_O	Δm_O
t	t	t
0.075	30000.000	-0.200
0.051	29999.800	-0.181
0.034	29999.619	-0.168
0.022	29999.450	-0.160
0.014	29999.290	-0.154
0.008	29999.136	-0.151
0.004	29998.985	-0.149
0.002	29998.836	-0.148
0.000	29998.688	-0.148
-0.001	29998.541	-0.148
-0.001	29998.393	-0.148
-0.001	29998.245	-0.148
-0.001	29998.097	-0.148
-0.001	29997.949	-0.149
0.000	29997.800	-0.149
0.000	29997.652	-0.149
0.001	29997.503	-0.149
0.001	29997.354	-0.148
0.002	29997.206	-0.148
0.002	29997.058	-0.148
0.003	29996.910	-0.147
0.003	29996.763	-0.146
0.003	29996.617	-0.146
0.004	29996.471	-0.145
0.004	29996.327	-0.144
0.004	29996.183	-0.143
0.004	29996.040	-0.142
0.004	29995.898	-0.141
0.005	29995.757	-0.140
0.005	29995.618	-0.139
0.005	29995.479	-0.137
0.005	29995.342	-0.136
0.005	29995.205	-0.135
0.005	29995.071	-0.134

0.005	29994.937	-0.132
0.005	29994.804	-0.131
0.005	29994.673	-0.130
0.005	29994.543	-0.129
0.005	29994.415	-0.127
0.005	29994.287	-0.126
0.005	29994.161	-0.125
0.005	29994.036	-0.124
0.005	29993.913	-0.122
0.005	29993.790	-0.121
0.005	29993.669	-0.120
0.005	29993.550	-0.118
0.005	29993.431	-0.117
0.005	29993.314	-0.116
0.005	29993.198	-0.115
0.005	29993.083	-0.114
0.005	29992.970	-0.112
0.005	29992.857	-0.111
0.005	29992.746	-0.110
0.005	29992.636	-0.109
0.005	29992.528	-0.108
0.005	29992.420	-0.106
0.005	29992.314	-0.105
0.005	29992.208	-0.104
0.004	29992.104	-0.103
0.004	29992.001	-0.102
0.004	29991.899	-0.101
0.004	29991.799	-0.100
0.004	29991.699	-0.099
0.004	29991.600	-0.098
0.004	29991.503	-0.096
0.004	29991.406	-0.095
0.004	29991.311	-0.094
0.004	29991.217	-0.093
0.004	29991.123	-0.092
0.004	29991.031	-0.091
0.004	29990.940	-0.090
0.004	29990.849	-0.089
0.004	29990.760	-0.088
0.004	29990.672	-0.087
0.004	29990.584	-0.086
0.004	29990.498	-0.085
0.004	29990.413	-0.085
0.004	29990.328	-0.084
0.004	29990.244	-0.083
0.004	29990.162	-0.082
0.004	29990.080	-0.081
0.004	29989.999	-0.080
0.003	29989.919	-0.079
0.003	29989.840	-0.078
0.003	29989.762	-0.077
0.003	29989.684	-0.077
0.003	29989.608	-0.076
0.003	29989.532	-0.075
0.003	29989.457	-0.074
0.003	29989.383	-0.073

0.003	29989.310	-0.072
0.003	29989.237	-0.072
0.003	29989.166	-0.071
0.003	29989.095	-0.070
0.003	29989.025	-0.069
0.003	29988.955	-0.069
0.003	29988.887	-0.068
0.003	29988.819	-0.067
0.003	29988.752	-0.066
0.003	29988.686	-0.066
0.003	29988.620	-0.065
0.003	29988.555	-0.064
0.003	29988.491	-0.063
0.003	29988.427	-0.063
0.003	29988.365	-0.062
0.003	29988.303	-0.061
0.003	29988.241	-0.061
0.003	29988.180	-0.060
0.003	29988.120	-0.059
0.003	29988.061	-0.059
0.003	29988.002	-0.058
0.003	29987.944	-0.057
0.002	29987.887	-0.057
0.002	29987.830	-0.056
0.002	29987.774	-0.056
0.002	29987.718	-0.055
0.002	29987.663	-0.054
0.002	29987.609	-0.054
0.002	29987.555	-0.053
0.002	29987.502	-0.053
0.002	29987.449	-0.052
0.002	29987.397	-0.051
0.002	29987.345	-0.051
0.002	29987.294	-0.050
0.002	29987.244	-0.050
0.002	29987.194	-0.049
0.002	29987.145	-0.049
0.002	29987.096	-0.048
0.002	29987.048	-0.048
0.002	29987.000	-0.047
0.002	29986.953	-0.047
0.002	29986.907	-0.046
0.002	29986.861	-0.046
0.002	29986.815	-0.045
0.002	29986.770	-0.045
0.002	29986.725	-0.044
0.002	29986.681	-0.044
0.002	29986.637	-0.043
0.002	29986.594	-0.043
0.002	29986.552	-0.042
0.002	29986.509	-0.042
0.002	29986.468	-0.041
0.002	29986.426	-0.041
0.002	29986.386	-0.040
0.002	29986.345	-0.040
0.002	29986.305	-0.040

0.002	29986.266	-0.039
0.002	29986.227	-0.039
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0.002	29986.074	-0.037
0.002	29986.037	-0.037
0.002	29986.001	-0.036
0.002	29985.965	-0.036
0.002	29985.929	-0.035
0.002	29985.894	-0.035
0.002	29985.859	-0.035
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0.001	29985.756	-0.033
0.001	29985.722	-0.033
0.001	29985.689	-0.033
0.001	29985.656	-0.032
0.001	29985.624	-0.032
0.001	29985.592	-0.032
0.001	29985.560	-0.031
0.001	29985.529	-0.031
0.001	29985.498	-0.031
0.001	29985.467	-0.030
0.001	29985.437	-0.030
0.001	29985.407	-0.030
0.001	29985.377	-0.029
0.001	29985.348	-0.029
0.001	29985.319	-0.029
0.001	29985.290	-0.028
0.001	29985.262	-0.028
0.001	29985.234	-0.028
0.001	29985.206	-0.027
0.001	29985.178	-0.027
0.001	29985.151	-0.027
0.001	29985.124	-0.027
0.001	29985.098	-0.026
0.001	29985.072	-0.026
0.001	29985.046	-0.026
0.001	29985.020	-0.025
0.001	29984.994	-0.025
0.001	29984.969	-0.025
0.001	29984.944	-0.025
0.001	29984.920	-0.024
0.001	29984.895	-0.024
0.001	29984.871	-0.024
0.001	29984.848	-0.024
0.001	29984.824	-0.023
0.001	29984.801	-0.023
0.001	29984.778	-0.023
0.001	29984.755	-0.023
0.001	29984.732	-0.022
0.001	29984.710	-0.022
0.001	29984.688	-0.022
0.001	29984.666	-0.022
0.001	29984.645	-0.021

0.001	29984.623	-0.021
0.001	29984.602	-0.021
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0.001	29984.561	-0.020
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0.001	29984.423	-0.019
0.001	29984.404	-0.019
0.001	29984.385	-0.018
0.001	29984.367	-0.018
0.001	29984.348	-0.018
0.001	29984.330	-0.018
0.001	29984.312	-0.018
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0.000	29982.922	-0.002
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[Redacted]

[Redacted]

