Statistical models of troposphere

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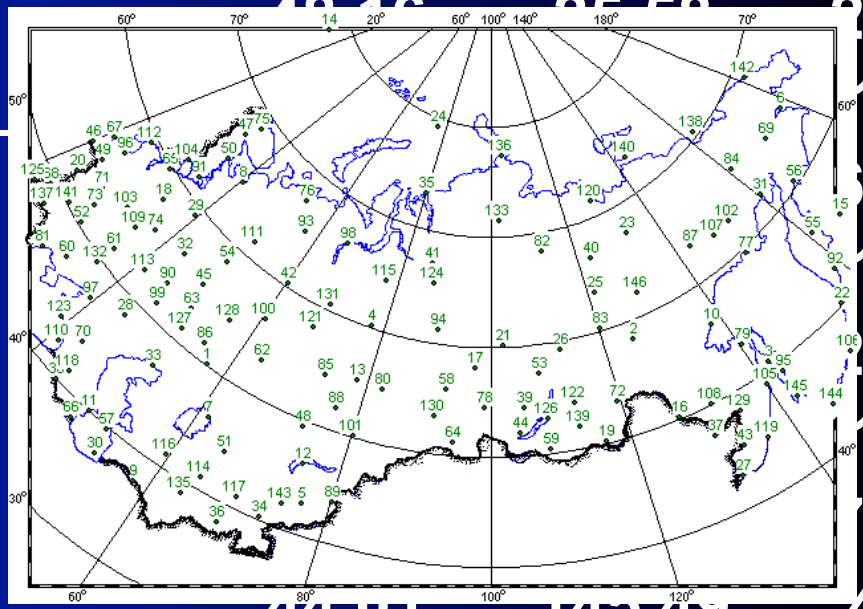
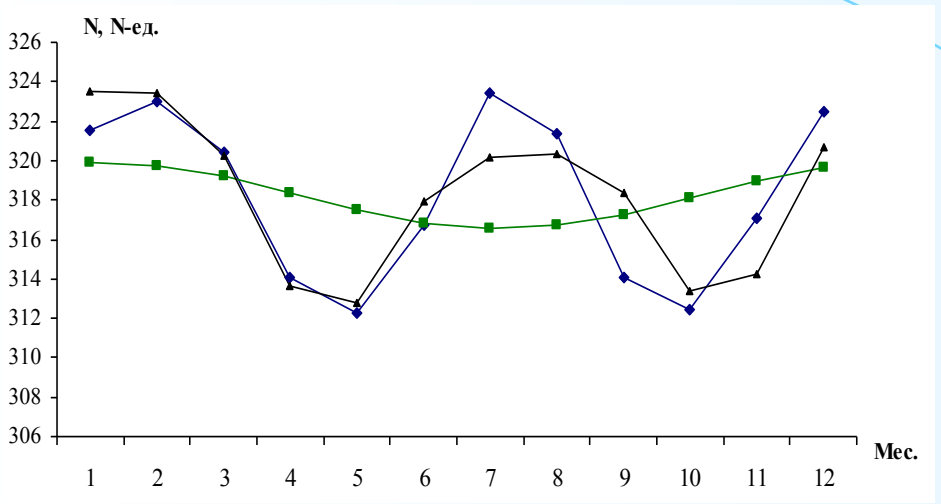
Upper-air sounding stations

No	Station	Width	Longi-tude	Height
136	Челюскина,_мыс	77.43	104.17	2
137	Черновцы			
138	Четырехстолбовый,_			
139	Чита			
140	Шалаурова,_мыс			
141	Шепетовка			
142	Шмидта,_мыс			
143	Фрунзе			
144	Южно-Курильск			
145	Южно-Сахалинск	46.55	142.44	2
146	Якутск	62.05	129.45	10



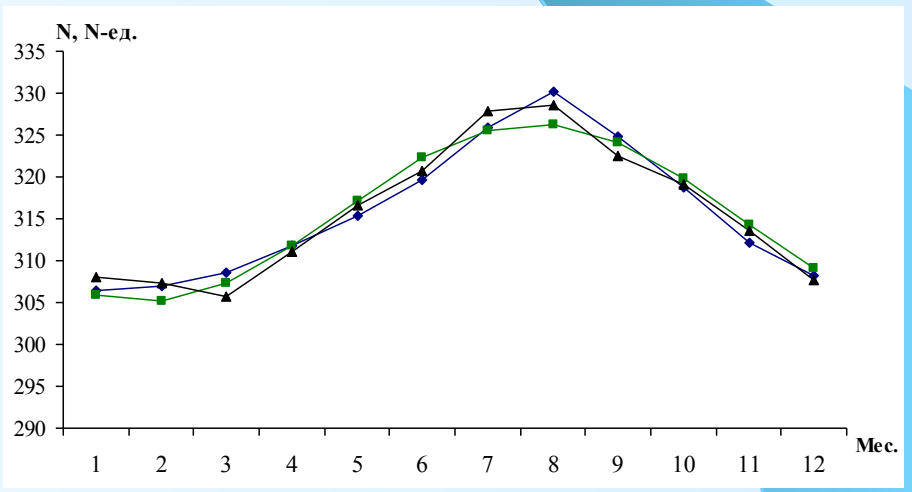
Harmonic analysis of seasonal variation *N*



Markovo

$$N = \frac{77.6}{T}\left(P + \frac{4810e}{T}\right)$$

$$N(t) = \overline{N} + \sum_{i=1}^{n/2} A_i Sin\left(\frac{360^\circ}{p} it\right) + B_i Cos\left(\frac{360^\circ}{p} it\right)$$



Simushir

The first harmonic (♦), the sum of the first three harmonics (■), ten-year average annual variationN(▲)

Parameters of the seasonal model

Region	N_m	C_1	C_2	C_3	t_1	t_2	t_3
Subarctic:							
continent	318,00	1,68	4,94	2,39	0,61	1,35	–1,16
shore	317,00	1,35	4,65	1,77	3,06	1,47	–1,17
Temperate:							
continent	319,00	14,17	12,06	2,47	–2,32	1,38	–0,63
shore	310,00	6,96	5,81	1,35	–2,44	1,46	–0,35
Primorye	320,00	19,82	10,21	2,38	–2,30	1,54	–0,33
Kamchatka	310,00	11,36	4,24	1,52	–2,38	1,68	–0,19
Sakhalin	318,00	10,91	4,54	1,50	–2,33	1,45	–2,63
Kuril Islands	316,00	10,89	2,47	0,83	–2,22	2,41	0,37

The values of the average N_m, amplitude and maximum time of the first three harmonics of the ten-year annual variation N given for the basic radio climatic regions of the Far East.

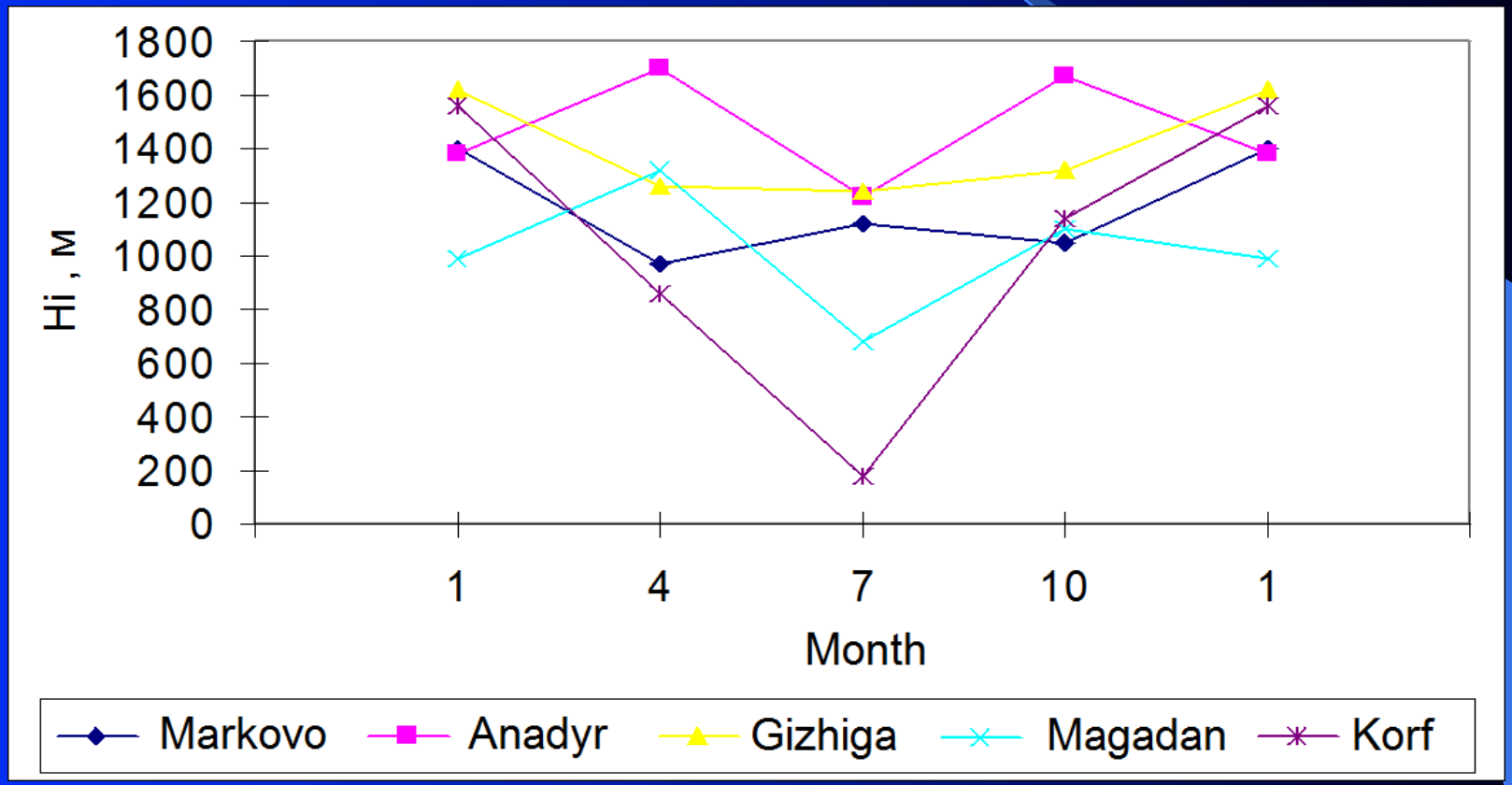
Parameters of the exponential model

Region	a_0, N-ед.				$a_1 \times 10^3$			
	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn
Subarctic: continent	318,40	313,40	322,80	312,10	–1,35	–1,28	–1,30	–1,27
shore	316,80	313,60	324,40	311,80	–1,32	–1,27	–1,32	–1,26
Temperate: continent	315,30	305,70	344,80	311,20	–1,31	–1,22	–1,44	–1,27
shore	307,70	305,20	321,20	304,90	–1,27	–1,23	–1,32	–1,24
Primorye	310,10	306,10	330,70	316,90	–1,25	–1,23	–1,39	–1,35
Kamchatka	302,60	305,70	324,80	308,40	–1,21	–1,23	–1,33	–1,26
Sakhalin	311,80	311,00	339,60	319,60	–1,25	–1,26	–1,40	–1,27
Kuril Islands	306,60	311,00	331,30	318,60	–1,22	–1,29	–1,34	–1,37

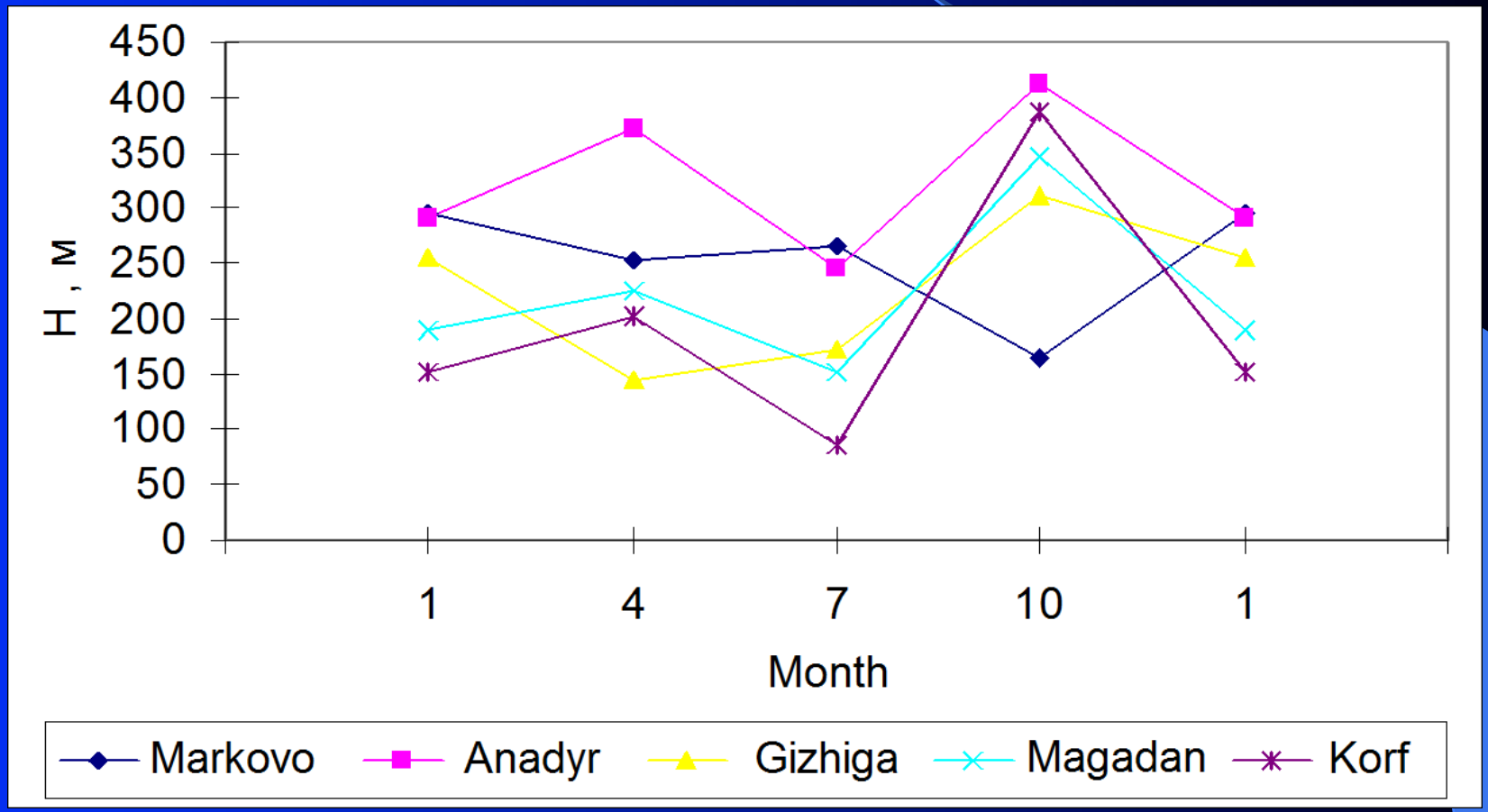
$$a_1 = \frac{\sum_{i=1}^{n} h_i \sum_{i=1}^{n} \lg h_i - n \sum_{i=1}^{n} h_i \lg N_i}{\lg \exp\left[\left(\sum_{i=1}^{n} h_i\right)^2 - n \sum_{i=1}^{n} h_i^2\right]},$$

$$\lg a_0 = \frac{1}{n \sum_{i=1}^{n} \lg N_i - a_1 \lg \exp \sum_{i=1}^{n} h_i}.$$

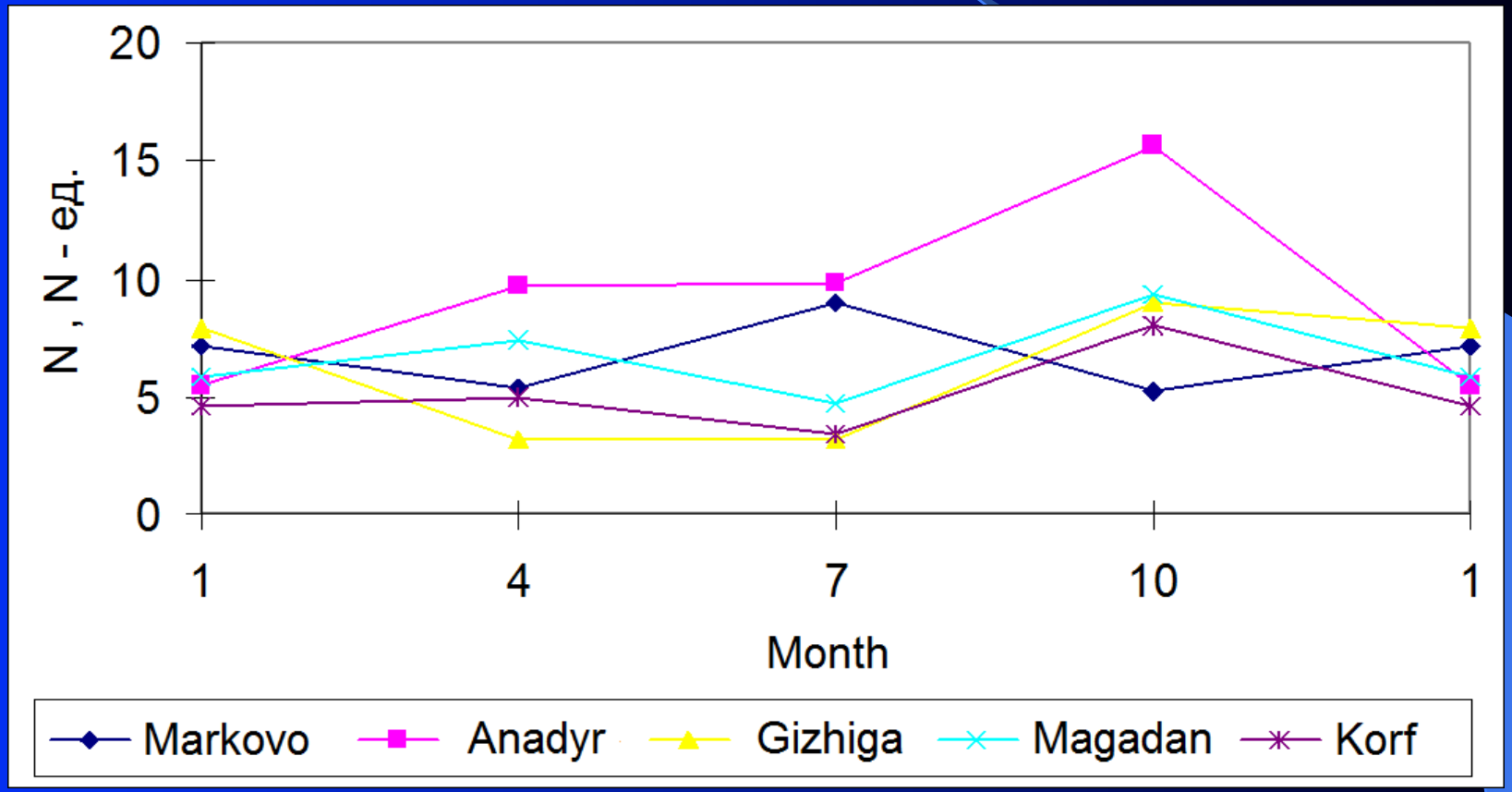
Seasonal variation in the height of the lower boundary



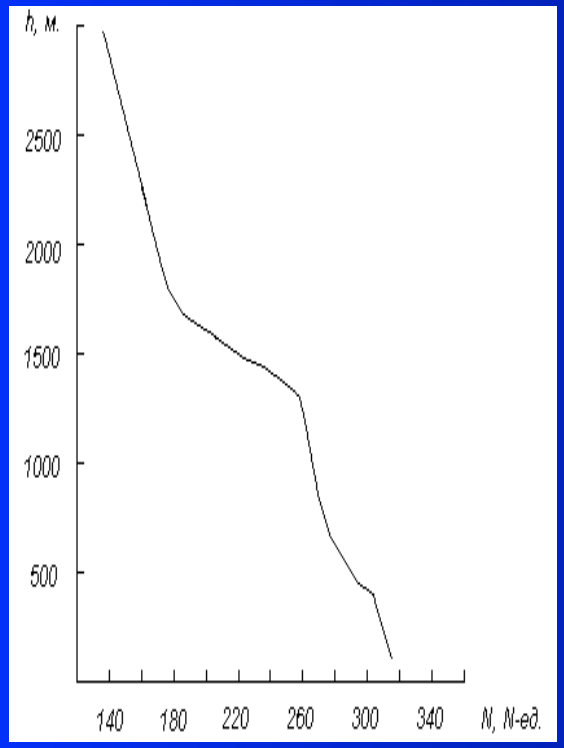
Seasonal variation of power



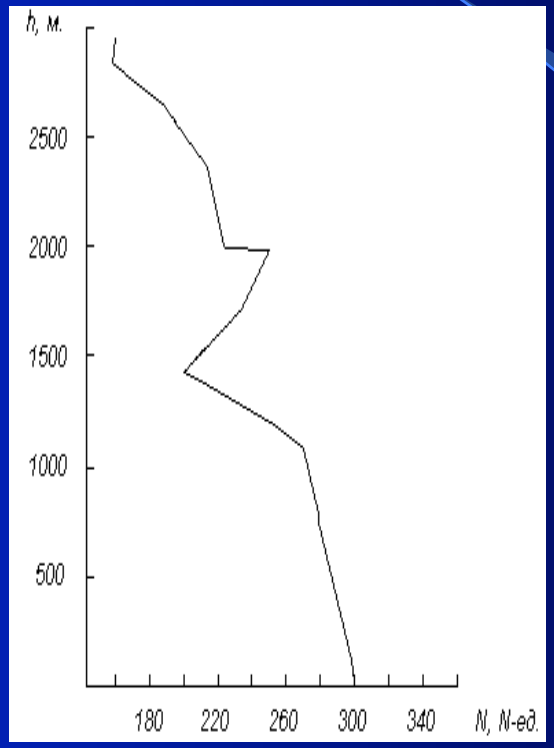
Seasonal variation of the intensity



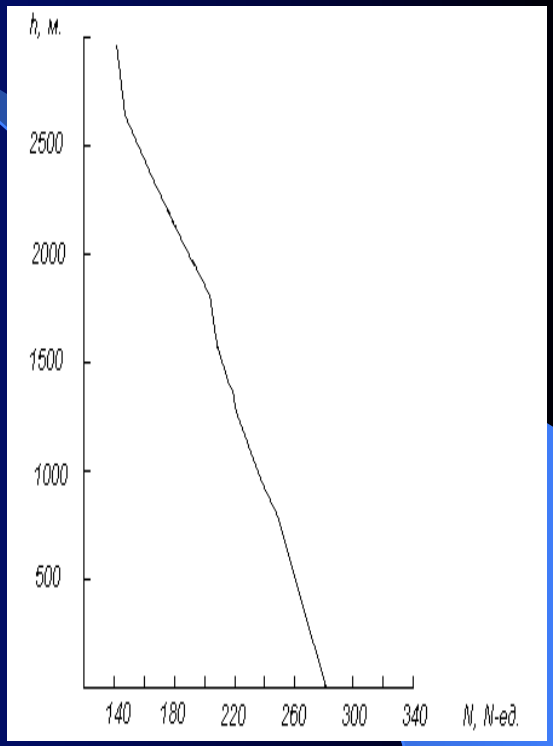
Vertical profile *N*



Vertical profile *N* (anticyclonic type).



Vertical profile *N* (local type).



Vertical profile *N* (cyclonic type).

Conclusion

•Created on spatial-temporal model of the troposphere, which includes the model of periodically time-dependent seasonal changes radio meteorological parameters and the exponential model of the dependence of the refractive index of the height.

•We have divided into main radio climatic zones of the Pacific coastal territory according to parametric statistical criteria. We calculate exponential parameters, values of the average of N in the basic physic-climatic zones of regions.

•We made isoclines maps of N and g_n for upper-air sounding stations for all the time radio sounding troposphere and the basic seasons of the year.