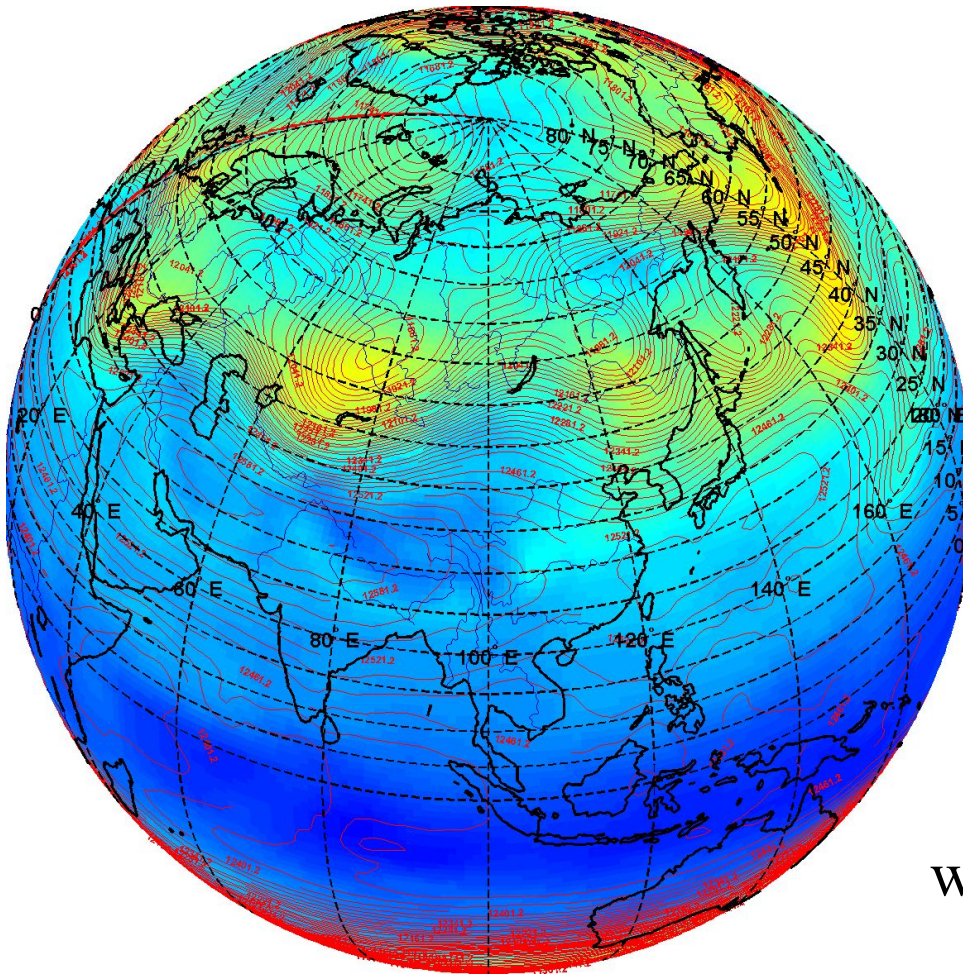


# Ozone field disturbances by cyclones over the territory of Siberia

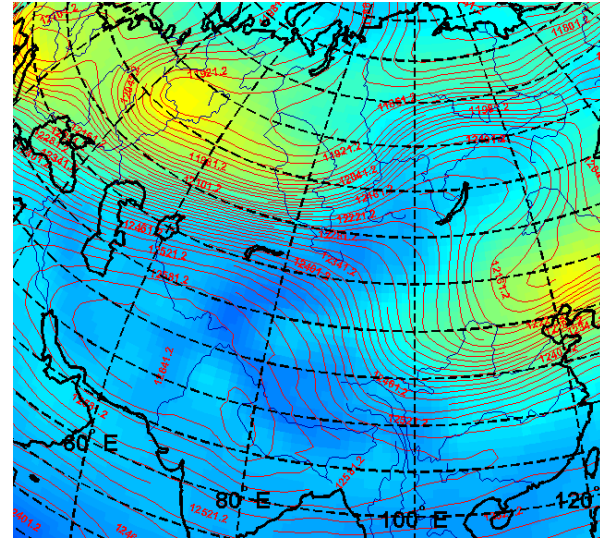
V.V. Zuev, N.E. Zueva, I.I. Ippolitov, S.V. Loginov,  
E.V. Kharyutkina

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# Geopotential height (H, hPa)



Cyclone decay 2005 15 July 12h



Reanalysis data JRA-25  
with spatial resolution  $1,25 \times 1,25^\circ$

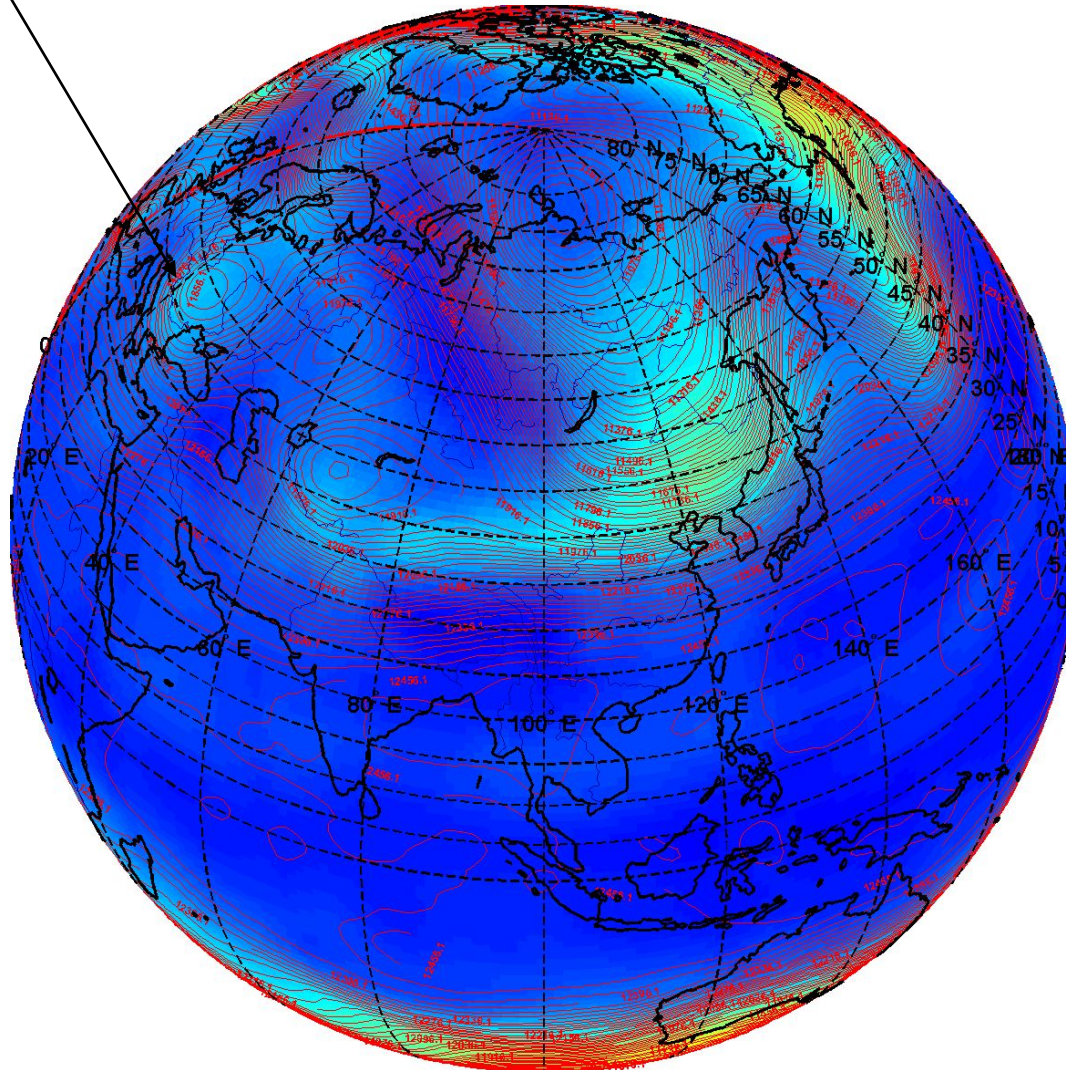
(the long-term reanalysis cooperative research project carried out by the Japan Meteorological Agency (JMA) and the Central Research Institute of Electric Power Industry (CRIEPI))

# 2005 and 2007: 12 cyclones

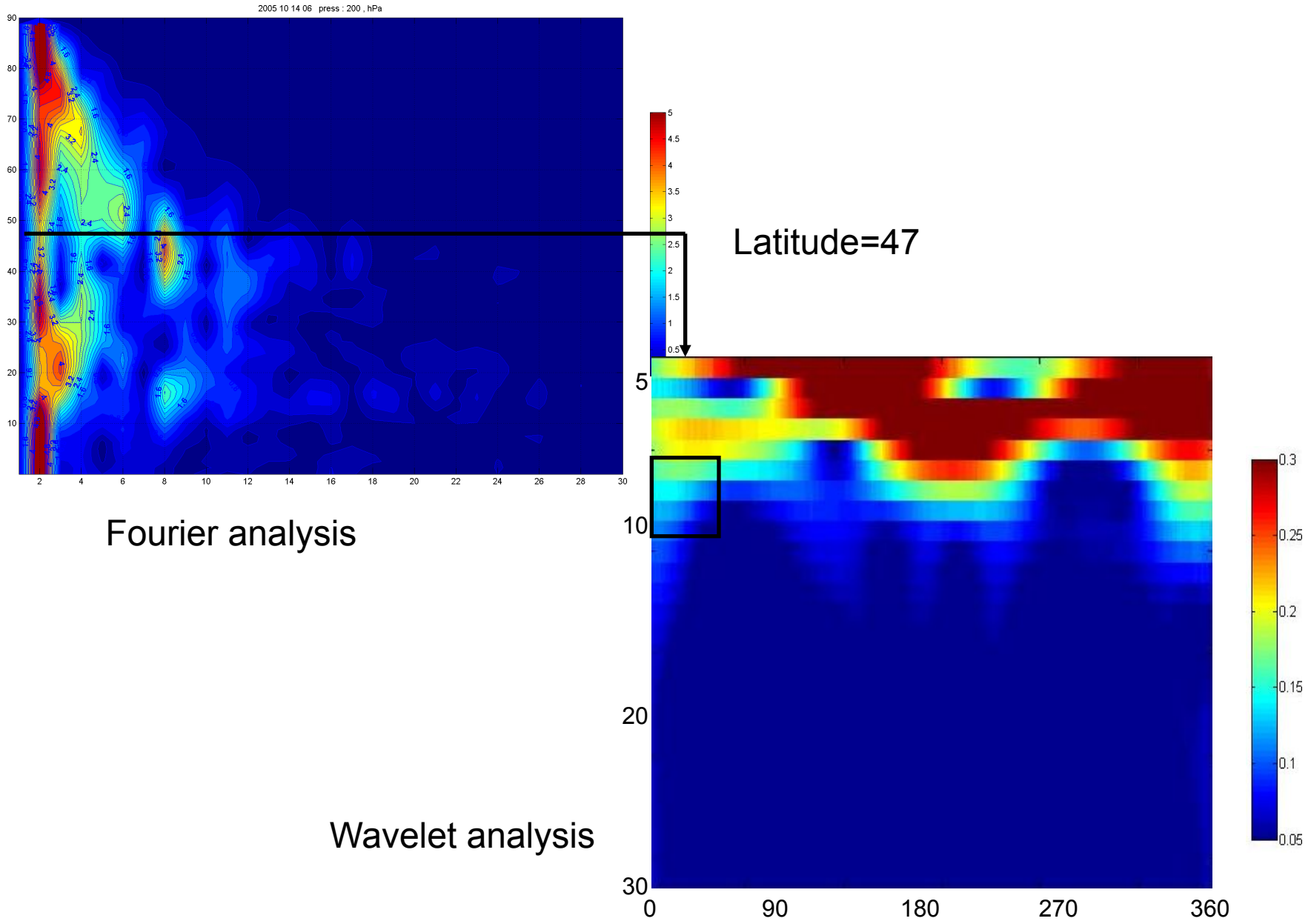
<b>№</b>	<b>Dates of cyclone beginning and decay</b>	<b>Height of development, hPa</b>	<b>Location</b>	<b>Wave number</b>
1	12 July 18h – 16 July 12h 2005	150	South of West Siberia	6
2	05 Nov 06h – 09 Nov 06h 2005	200	North of West Siberia	7
3	27 Aug 00h – 30 Aug 12h 2005	200	Tropical cyclone	12
4	25 Feb 00h - 27 Feb 18h 2007	500	South of West Siberia	6
5	25 May 00h - 27 May 12h 2007	250	West Siberia	7
6	03 Sept 00h – 04 Sept 12h 2007	300	South of West Siberia	9
7	25 Oct 00h – 29 Oct 06h 2007	300	North of West Siberia	6
8	20 Feb 18h – 26 Feb 18h 2005	500	North of West Siberia	-
9	05 Mar 18h – 09 Mar 00h 2005	250	South of West Siberia	-
10	13 Oct 12h– 16 Oct 12h 2005	200	East Europe	10
11	19 July 18h – 25 July 18h 2007	150	West Siberia	6
12	14 Oct 06h – 16 Oct 00h 2007	200	European part of Russia	6

Cyclone in maturation stage

13 Oct 12h – 16 Oct 12h 2005  
200hPa



# Estimation of wave number



# Correlation between cyclone characteristics and ozone variations for ozonepause in three points (45°N, 50°N и 55°N) on 40°E

№12

Height, hPa	$r(\Gamma, \delta O_3)$			$r(\Delta P, \delta O_3)$		
	<b>45</b>	<b>50</b>	<b>55</b>	<b>45</b>	<b>50</b>	<b>55</b>
1000	<b>0,51</b>	-0,33	<b>-0,62</b>	<b>0,58</b>	<b>-0,48</b>	<b>-0,79</b>
925	0,22	0,33	0,09	<b>0,41</b>	0,09	-0,22
850	<b>-0,39</b>	<b>0,55</b>	<b>0,66</b>	<b>-0,43</b>	<b>0,63</b>	<b>0,78</b>
700	-0,29	<b>0,53</b>	<b>0,62</b>	<b>-0,42</b>	<b>0,57</b>	<b>0,75</b>
600	-0,21	<b>0,36</b>	<b>0,42</b>	<b>-0,36</b>	0,21	<b>0,37</b>
500	0,11	<b>0,68</b>	<b>0,44</b>	<b>-0,42</b>	-0,28	0,10
400	0,15	<b>0,74</b>	<b>0,43</b>	-0,14	<b>-0,86</b>	<b>-0,50</b>
300	0,05	<b>0,83</b>	<b>0,57</b>	<b>-0,36</b>	<b>-0,81</b>	-0,29
250	0,05	<b>0,83</b>	<b>0,57</b>	<b>-0,50</b>	<b>-0,44</b>	0,06
200	<b>0,54</b>	<b>0,76</b>	-0,34	0,01	0,00	-0,02

# Correlation between cyclone characteristics and ozone variations for low and middle troposphere in three points

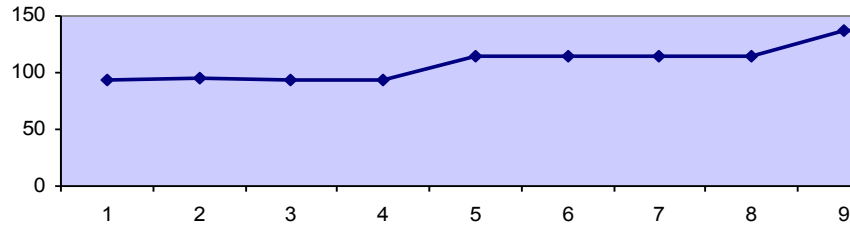
№6, 75°E

№12, 40°E

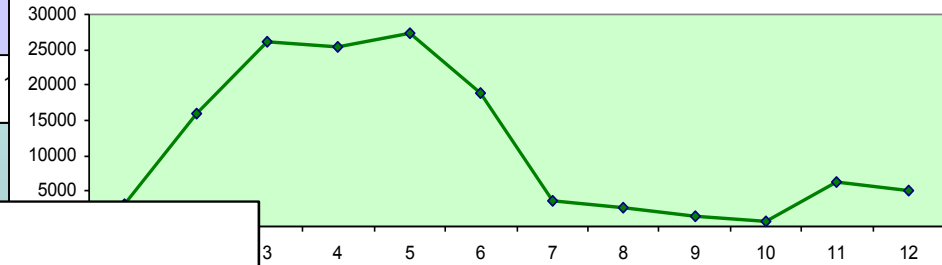
Height, hPa	$r(\Gamma, \delta O_3)$			$r(\Delta P, \delta O_3)$			Height, hPa	$r(\Delta P, \delta O_3)$			$r(\Delta P, \delta O_3)$		
	47.5	50.0	52.5	47.5	50.0	52.5		45	50	55	45	50	55
1000	0,35	<b>0,42</b>	<b>0,41</b>	<b>0,54</b>	<b>0,59</b>	<b>0,58</b>	1000	0,26	-0,29	<b>-0,72</b>	0,26	-0,29	<b>-0,72</b>
925	0,06	0,12	0,10	0,12	0,09	0,06	925	0,34	0,23	-0,08	0,34	0,23	-0,08
850	<b>0,68</b>	<b>0,70</b>	<b>0,70</b>	<b>0,61</b>	<b>0,55</b>	<b>0,53</b>	850	-0,13	<b>0,46</b>	<b>0,72</b>	-0,13	<b>0,46</b>	<b>0,72</b>
700	<b>0,51</b>	<b>0,51</b>	<b>0,52</b>	<b>0,44</b>	<b>0,43</b>	<b>0,45</b>	700	-0,11	<b>0,43</b>	<b>0,74</b>	-0,11	<b>0,43</b>	<b>0,74</b>
600	<b>0,68</b>	<b>0,68</b>	<b>0,68</b>	<b>0,61</b>	<b>0,61</b>	<b>0,62</b>	600	-0,14	0,00	<b>0,53</b>	-0,14	0,00	<b>0,53</b>
500	<b>0,66</b>	<b>0,66</b>	<b>0,66</b>	<b>0,87</b>	<b>0,87</b>	<b>0,87</b>	500	-0,41	-0,41	-0,03	-0,41	-0,41	-0,03

# Time series of ozone and circulation

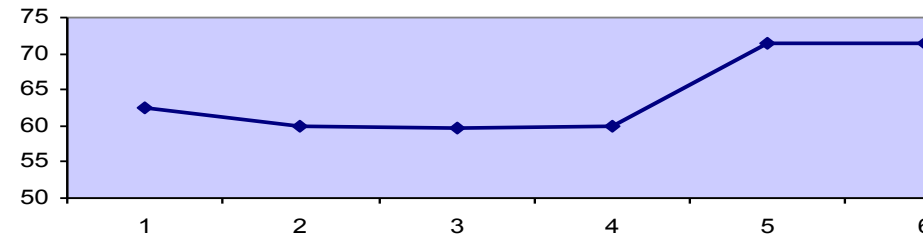
Ozone\_№4



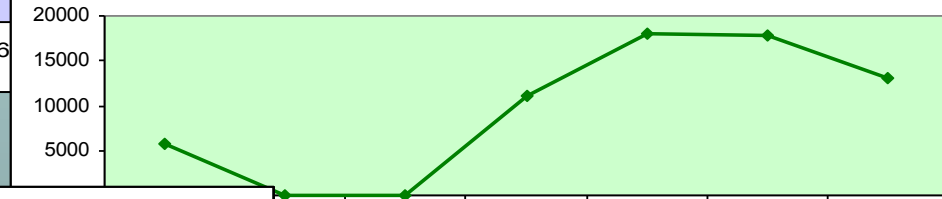
Circulation\_№4



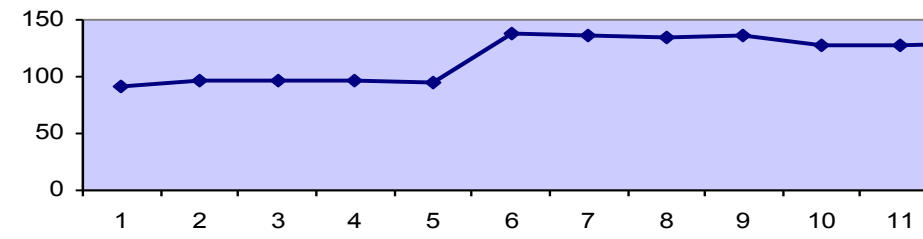
Ozone\_№6



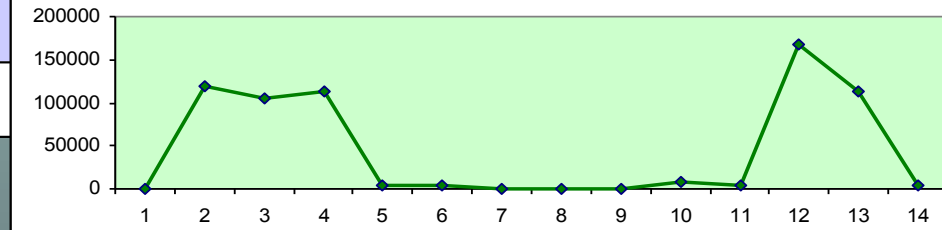
Circulation\_№6



Ozone\_№9



Circulation\_№9





# Classification

<b>Groups</b>	<b>Cyclone number (wave number)</b>
<b>I</b> - ozone and circulation variations have the same tendency of development:  a) increasing & increasing	1(6), 5(7), 6(9), 10(10)
b) decreasing & decreasing	2(7), 3(12), 12(6)
<b>II</b> - circulation decreasing leads to ozone increasing	4(6), 7(6), 11(6)
<b>III</b> - other cases	8(-), 9(-)

**Thank you for attention!**