

We very much appreciate the overall positive attitude of the referee to our manuscript and thank him for particularly useful comments. The comments, questions and suggestions of the referee are presented in italics.

The authors analyze data in several regions of the global ocean to estimate the exceedance frequency of internal waves with various amplitudes in the actual range of amplitude variation. Their analysis is based on the statistical theory. They find the probability distribution of the occurrence of large and small amplitudes of internal waves. They compare the distributions of amplitudes described by the Gauss and Poisson functions. The authors find statistical estimates of the existence of internal waves with different amplitudes. They conclude that internal waves with large amplitudes cannot be described by the Gaussian distribution. The authors find that the observed exceedance probability of large-amplitude internal waves in most cases can be described by the Poisson distribution function, which is one of the typical curves of extreme statistics.

The manuscript can be published in the Nonlinear Processes in Geophysics, but more work is needed before publication to improve the text and analysis. Major revision is needed. The authors should check the style and grammar of the text.

Line to line comments are below.

Page 1 line 25

It is better to cite paper [Morozov E.G., Trulsen K., Velarde M.G., and Vlasenko V.I., Internal tides in the Strait of Gibraltar, J. Physical Oceanography, vol. 32, 3193-3206, 2002] instead of [Morozov 2003] to show extreme waves in the shelf region. The amplitude of internal waves in the Strait of Gibraltar reaches 150 m.

Done

Extreme waves of high amplitudes in the Kara Gates Strait are analyzed in [Morozov E.G., Parrilla-Barrera G., Velarde M.G., Scherbinin A.D., The Straits of Gibraltar and Kara Gates: A Comparison of Internal Tides, Oceanologica Acta, Vol. 26 (3), 231-241, 2003; Morozov E.G., Paka V.T., Bakhanov V.V., Strong internal tides in the Kara Gates Strait, Geophysical Research Letters, p. L16603, 2008].

We cited these papers

Page 1 line 28

Citation: "Large-amplitude internal waves have great interest". Internal waves have no interest in anything. Internal wave cause interest of researches because....

*This phrase on p. 1 line 29 is changed on "Large-amplitude internal waves **cause interest** of researchers..."*

Page 2 line 4

Citation: "intense large-amplitude waves being are treated as outliers of a given random process". I believe the authors wanted to say that they interpret internal waves as outliers of a random process. It is incorrect to write: "being are"

It is changed on page 2 line 5-6 as

*"Internal waves in the ocean can be considered as a continuous random process, **and their large amplitude values may be interpreted as outliers of a random process and be described by the tails of the distribution functions.**"*

Page 2 line 9

Citation: “is observed at the longitude 116.5°E and the June 2000 was the most reach on the generation of the internal wave packets”

It is not correct to relate the physical phenomena to longitude and dates. I believe that the fact of intense generation of internal wave packets is related to the steep bottom topography in the region of this longitude in the South China Sea and intense tidal forcing in this time period.

It is changed on page 2 line 10 as

“It is demonstrated there that the largest number of internal wave packets here is observed at the longitude 116.5°E (in the latitude band 20-22°N) in June 2000 due to intense tidal forcing in the South China Sea.”

Page 2 line 18, Page 7 line 22, Page 10 line 8

Please unify the name of the Mesopolygon experiment

Done

Page 4 line 5

Citation: “which can be as danger as large crests” *Where does the danger come from?*

We mentioned in the Introduction:

“Large-amplitude internal waves cause interest of researchers due to their dangerous action on offshore platforms (Fraser, 1999; Song et al., 2011), their influence on safety of submarines and underwater vehicles (Osborn, 2010). The special warning systems are developed now in regions of high risk of a pipe and platform damage by the intensive internal waves (Stöber and Moum, 2011).”

We would not like to say this again on page 4.

Page 6 line 1

Citation: “Its mean value can be calculated only if wave record is long enough, that is usually to measure in the ocean.” *I did not understand this phrase. Did you mean that you have to make long measurements in the ocean?*

We delete this sentence

Page 6 section 3.1

You analyze distributions of amplitudes in different regions of the ocean, but in this section, you did not say anything about the amplitudes of internal waves in this region.

We indicated in the manuscript page 6 line 12: “The maximum wave height here is not more than 5 m...”

Page 7 line 26

It s very difficult for the readers to get an access to this book [Kort, 1988]. Please write a few more sentences than you did explaining the experiment with many moorings.

We add some more information on page 7 line 23 extracting from (Morozov et al., 1998)

“Seventy-six moorings with current and temperature meters were deployed in the study area called Mesopolygon- 85 in the eastern part of the Atlantic Ocean with the objective of studying mesoscale variability of hydrophysical processes. The area was located at the juncture of the Canary Basin and the Cabo Verde Basin (19-21°N and 36-38°E). The buoy stations operated

approximately two months from April to May. The meters were placed on four horizons, but the most representative measurements were made at the height level of 200 m. The total size of the area was approximately 80 to 80 miles. The sampling interval was 15 min. In the Mesopolygon area, the bottom is covered with hills from 500 to 1000 m high over the floor. Such hills are located every 10 or 20 miles. They form a corrugated bottom topography over which the horizontal streamlines of barotropic currents are deformed. Thus, the internal tide is generated immediately in this area over the deep-sea bottom topography.”

Page 7 line 28

Canary Deep and the Green Cape Deep. These names of the deep basins are not correct. It is better to use Canary Basin and Cabo Verde Basin or Gambia Abyssal Plain for the entire region.

Done

Page 7 line 30; page 9 line 6

Horizon is not a proper term. Please use depth or level

Done

Page 8 line 1

Celsius ⇒ Celsius degrees or centigrade

Done

Page 8 line 8

Citation: “Unfortunately, we could not able to convert”. Please use could not or you were not able. You can use mean vertical temperature gradient in the region to convert temperature fluctuations to vertical displacements.

Unfortunately, we were not able to find temperature profile in this region at time of observation, and prefer to give in manuscript only initial data to eliminate possible errors due to transformation initial data into vertical displacement.

Page 8 line 20

Please explain what do you mean by poor regime. Citation: “The wave regime in the eastern Mediterranean is relatively poor, since the tide is very small.” Do you mean that internal tides are not intense?

We delete this sentence

Page 8 line 20

The wave height distribution function is calculated from these data. You did not say anything about the data. Please explain what sort of data you use because you calculate amplitudes. Do you use towed measurements?

We add on page 8 line 16: “The probe by MHI 4106 (temperature sensor of 25 meters length) had been dragged in tacks crossing as a star. The data of temperature recalculate after into the vertical isopycnal displacement.”

Page 9 line 1

Citation: “smaller amplitudes than in the ocean, where 100-meter waves are recorded (Ramp et al., 2004).” Internal wave amplitudes equal to 100 m are not characteristic of the ocean. They can be

found only in a few regions, for example the Mascarene Ridge [Morozov E.G., Vlasenko V.I., Extreme tidal internal waves near the Mascarene ridge, J. Marine Systems, Vol. 9, no 3-4, p. 203-210, 1996] or in the region of the Luzon Strait described in (Ramp et al., 2004).

We add on page 9, line 1: **“It should be noted that the observed internal waves at this region have much smaller amplitudes than on the ridges, for example the Mascarene Ridge (Morozov et al., 1996) or in the Luzon Strait where 100-meter waves are recorded (Ramp et al., 2004).”**

Page 9 line 29

Citation: “Nevertheless, the internal waves in the eastern Mediterranean Sea have amplitudes not more than 2 m but the amplitude distribution function closes to the Poisson law.” The distribution function is close to the Poisson law? How do you explain this fact? Small amplitudes should be described by the Gaussian distribution.

This comment was very useful. We delete this sentence and compare two approximations for distribution functions: Gaussian and Poisson. Both are well (see new Figure 1). We modify formula (20) and add in the end of paragraph the following sentence, page 9, line 4: **It is why that observed height distribution is in “middle” between Gaussian statistics (for weak-amplitude waves) and Poisson statistics (for large-amplitude waves).**

Page 10 line 1

Citation: “and should be not depended from the”. Should not depend on

Done

Page 10 line 4-5

Citation: “We may connect this value with capacity the region to generating of internal waves.” We can attribute this difference to the intensity of internal wave generation in various regions of the ocean. It is impossible to write “to generating”

We change this sentence on (page 10 line 6): **“We can attribute this difference to the intensity of internal wave generation in various regions of the ocean.”**

Page 10 line 6

Citation: “are generated by fresh water intrusion into ocean salted”. What is ocean salted?

It is known that tropical South Atlantic is a region of strong internal waves due to strong generation of internal tides by the interaction between the barotropic tide and bottom topography [Morozov E.G. Semidiurnal internal wave global field, Deep Sea Research, vol. 42, No 1, 1995, 135-148]. In this publication you can find characteristics of internal tide and comparison of their intensity in different regions of the ocean needed for the analysis of your review of internal waves in different regions.

We change on page 10, line 7 the sentence on the suggested by reviewer: **“It is known that tropical South Atlantic is a region of large-amplitude internal waves due to strong generation of internal tides by the interaction between the barotropic tide and bottom topography”**

Page 10 line 9

Citation: “that internal waves in the Mezopolygon-85 are not too often generated.” I would say that internal waves of **high amplitudes** are not often recorded in this region, but ordinary internal waves are generated always.

Done, we add words on page 10, line 10 “internal waves of high amplitudes are not often recorded in this region, but ordinary internal waves are generated always.”

Page 10 line 10

*Citation: “Now the numerical methods to predict internal wave field characteristics in different areas of the World Ocean **is** actively applied.” I would write that: “Currently, the numerical methods to predict internal wave field characteristics in different areas of the World Ocean **are widely** applied.”*

Done, page 10, line 12

Page 10 line 12

Citation: “Water stratification is varied in night and day during months and the moon tidal wave is varied also.” This is something that does not make sense. The sentences in lines 13-16 were written without checking, please remove them and write reasonable conclusions.

Done. We re-write some last sentences.