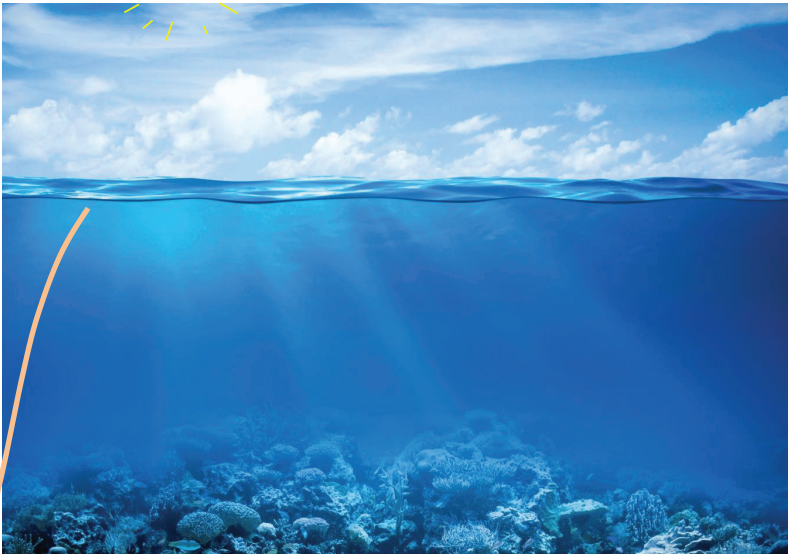
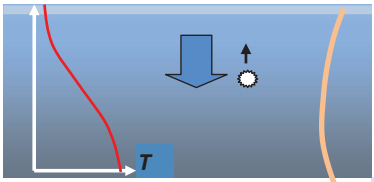
Research (What is it about?)	**Microbubble layer on the sea surface**
UNN authors	*Bubukin I.T.*
We find (The result)	It has been found that the microbubble air layer located under the surface tension film of the sea surface is a universal formation in the structure of the cold boundary layer
Abstract	The ***cold boundary layer*** of the sea surface is formed when the water temperature is higher than the air temperature and the heat flux is directed from the sea to the atmosphere. Due to evaporation and diffusion heat transfer, water at the interface of the sea surface and the atmosphere cools down. Convection limits the thickness of the cold boundary layer to several millimeters. At light winds, the thickness of this layer does not exceed 5–7 mm. No noticeable temperature gradients were observed beyond the boundary layer. The total difference between water temperatures on the surface and below the cold boundary layer does not exceed –1.5°C. It is known that the dielectric properties of the upper part of the film layer adjacent to the atmosphere differ significantly from the results obtained in laboratory measurements. It has been found that the cause of this is existence of ***microbubble air layer*** of tens micron thickness located under the surface tension film of the sea surface. The volume concentration of air microbubbles depends on temperature difference and water salinity. It is shown that the appearance of microbubble layer is the essential result of heat and gas exchange processes on the sea surface. As the concentration of air microbubbles depends on amount of heat flux on sea-air surface and it has been measured by IR-radiometry methods, one can create the remote monitoring system of sea surface ecology and underwater heat existence.

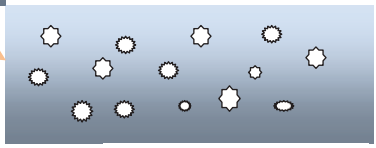
Representative articles 2016-2017, quartiles	1. *Bubukin I.T., Stankevich K.S.* Gas Exchange Between the Sea and the Atmosphere and the Mechanism of Formation of a Microbubble Layer under the Surface-Tension Film of the Sea Surface Derived from in situ Measurements of Self_Radiations of These Media in the Infrared Band. Journal of Communications Technology and Electronics. **61**(5), 478–485 (2016).	Q4
	Q-index (Qi) of the result	**1**

In collaboration	–

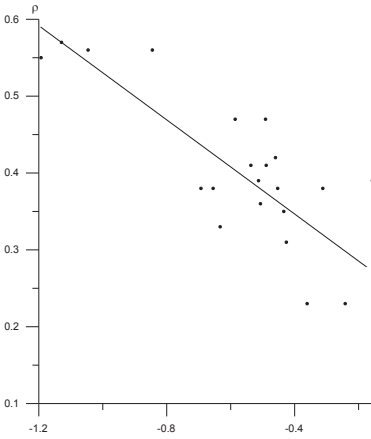




The temperature shape in boundary layer, convection in liquid, excretion of dissolved gas and microbubble formation



Microbubble layer



The volume concentration of air microbubbles in dependence of temperature difference (°C) on the surface and at a depth of 1 m