SUMMARY

When cutting an ice from lakes and ponds gaseous phase displays often ubiquitous bubble textures along the ice thickness. The occurrence of bubbles (enclosures filled with the gas) in ice relates to a content of the dissolved gas in the lake/pond water prior to freezing over the surface. When water freezes, dissolved gases are rejected and redistributed at the ice-water interface, depending on the saturation ratio between the gas and water. If the concentration of dissolved gases surpasses a critical value (as freezing progresses), the water at the interface becomes supersaturated, and gas bubbles nucleate and grow to a visible size along the interface. The bubbles generated at the ice-water interface are either incorporated into the ice crystal as the ice-water interface advances, thus forming gas pores in the ice, or released from the interface. If there is incorporation or release is determined by several factors. The bubbles nucleated at the advancing ice-water interface may be characterized by concentration, shape, and size, which depend on growth rate of ice, the amount of gases dissolved in water, and the particulate content of water.

This work focused on the relation between growth rates of the ice and the occurrence of bubbles in the pond ice. I monitored the temperature of the ice formed under natural conditions over the pond Dolní Tušimy in Mokrovraty, Czech Republic.

Distinct layers of gas bubbles were observed when the ice samples have been retrieved. These layers may relate to fast growth rates of ice. In this case the maximum growth rates were about 1 μm/s.

The results were compared with similar work done (Carte, 1961; Bari and Hallet, 1974; Yoshimura et al., 2008). This comparison showed distinction that may be due to different methods of ice formation (laboratory condition vs. natural conditions).