

Salinity Processes in the Upper Ocean Regional Study
NASA Jet Propulsion Laboratory
Video Transcripts

Video: Why the Top Centimeter Matters

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Description

Dr. Eric Lindstrom explains the importance of the top centimeter in understanding the whole ocean.

Transcript

To first-order all waters in the ocean have a temperature and salinity, and they got those characteristics when they were at the surface last. Waters don't change their density from when they were created. There are second-order things like mixing and things change.

Basically you can think of the ocean as two different colored paints that you pour in a can. You stir them around a bit, but you can still see the separate colors. Well, to first-order, you can think of water masses as different color paints. They stir, but they don't mix very fast. So they maintain their color characteristic for their life time. There isn't a lot of mixing in the deep ocean. A cold salty water parcel off the Antarctic continent gets really dense in the winter, and it falls down along the continental shelf all the way to the bottom. It's the coldest saltiest thing there. It spreads out across all the ocean basins and fills them up. You can find Antarctic bottom water down deep in all the oceans. It's still got those characteristics. You just trace them right back up to the surface.

We can even see that in chlorofluorocarbon, something that wasn't even in the atmosphere until say the 1930s or 1940s, or whenever it was invented. We spewed it out in spray cans. Well it got into the ocean water, and you can find it in little tiny parts per trillion of Antarctic bottom water where it was last at the surface. It's relatively newly exposed to the atmosphere, whereas some waters above it farther off the column haven't seen the atmosphere in 10,000 years, and they don't have any CFC's in them. The theory of how this works is well known. We got the chemical evidence that it works.

So why do we want to know the temperature and salinity in the top centimeter? Because it tells us about the whole ocean, not just at the top centimeter.