

2015

UNIVERSITY SUMMER FORUM
Chemistry & Society

WITH **BASSAM Z. SHAKHASHIRI**

PROFESSOR OF CHEMISTRY

WILLIAM T. EVJUE DISTINGUISHED CHAIR FOR THE WISCONSIN IDEA

DIRECTOR, WISCONSIN INITIATIVE FOR SCIENCE LITERACY

DEPARTMENT OF CHEMISTRY

UNIVERSITY OF WISCONSIN-MADISON



Wisconsin Initiative for
Science Literacy

**Wisconsin Initiative
for Science Literacy**

www.scifun.org



The mission of the Wisconsin Initiative for Science Literacy is to promote literacy in science, mathematics and technology among the general public and to attract future generations to careers in research, teaching and public service.



SCIENCE IS FUN

www.scifun.org

scifun@chem.wisc.edu



Wisconsin Initiative for
WISL
Science Literacy

Grand Challenges to Society and to Scientists

Help sustain Earth and its people in the face of:

- Population Growth
- Finite Resources
- Malnutrition
- Spreading Disease
- Deadly Violence
- War
- Climate Change
- Denial of Basic Human Rights, *especially the right to benefit from scientific and technological progress*



“In the short span of one or two generations, the majority of the 9 billion people on Earth will be living under the handicap of severe pressure on fresh water, an absolutely essential natural resource for which there is no substitute. This handicap will be self-inflicted and is, we believe, entirely avoidable.”

The Bonn Declaration on Global Water Security
Signed by 500 water scientists
Global Water System Project
May 2013 • Bonn, Germany





“Water-Intensive” Vegetables:

1 head of broccoli = **5.4 gallons of water**

1 tomato = **3.3 gallons of water**

Water Footprint of Beef Compared to Other Crops:

1 ton of beef = **4 million gallons of water**

1 ton of sugar beets = **52,000 gallons of water**

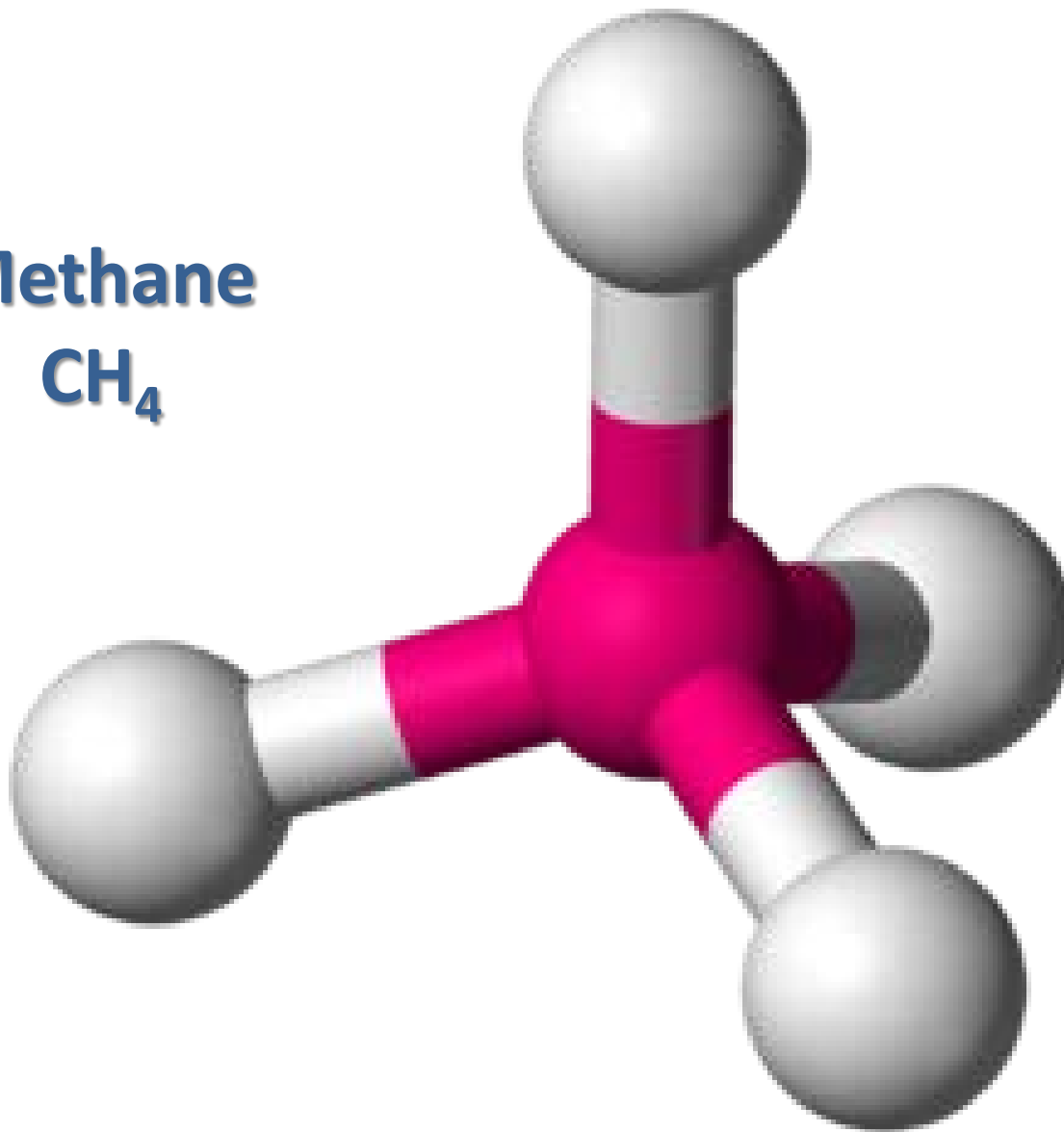
1 ton of vegetables = **85,000 gallons of water**

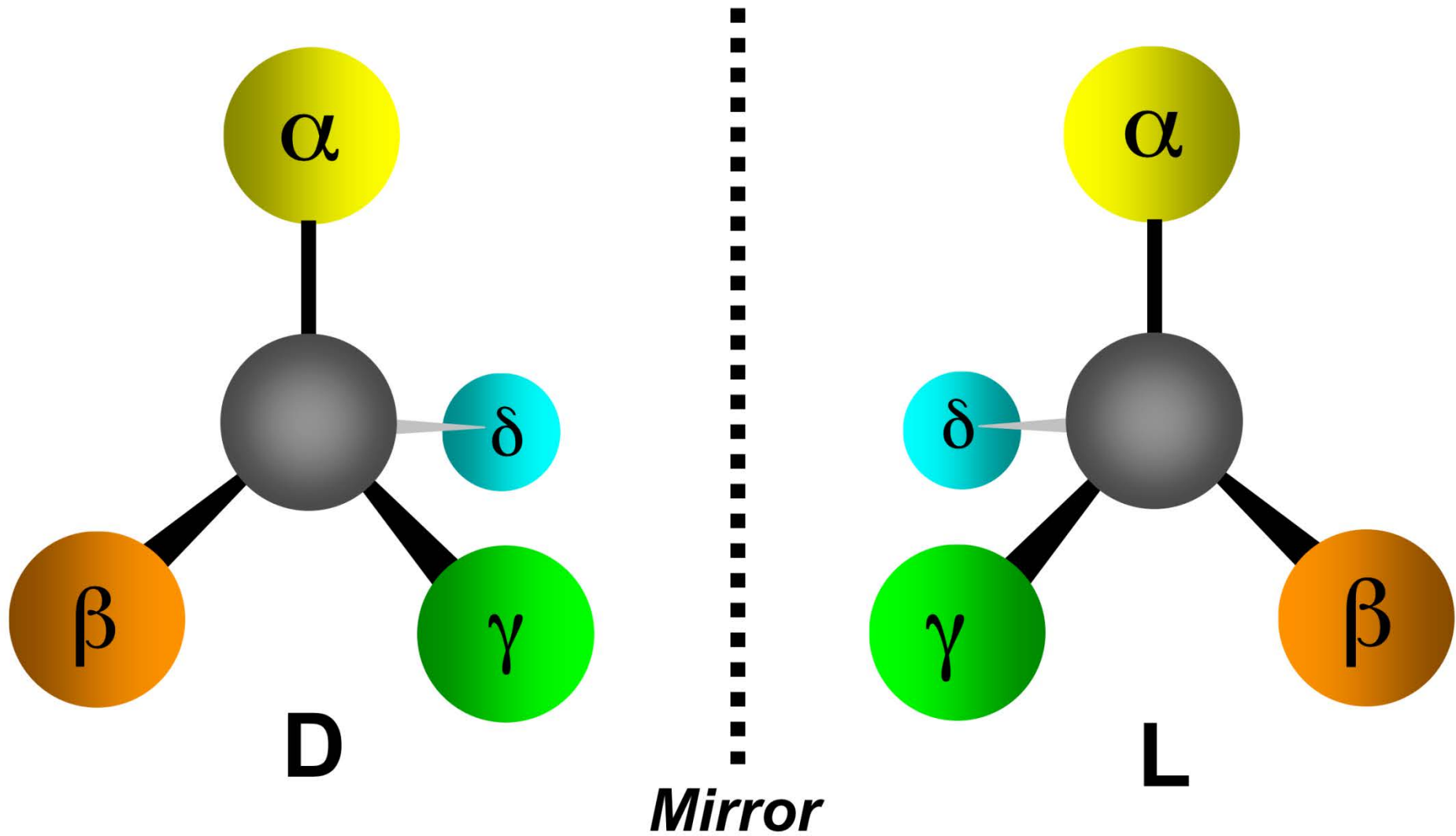
1 ton of starchy root vegetables = **102,200 gallons of water**

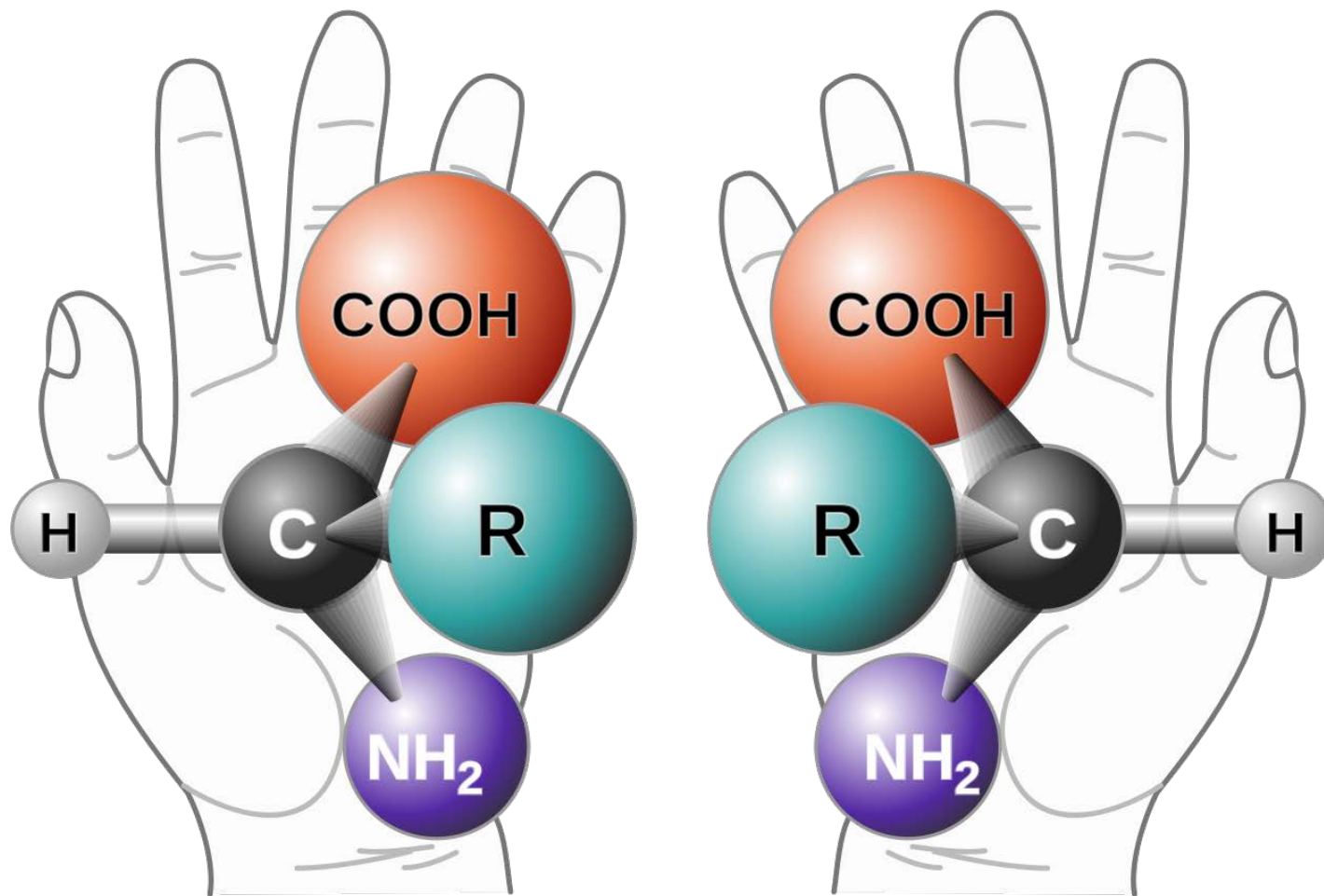
McWilliams, James. “Meat Makes the Planet Thirsty.” The New York Times 7 March 2014: NYTimes.com. Accessed 10 March 2014.



Methane
 CH_4

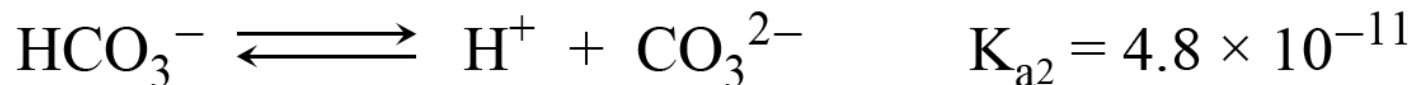
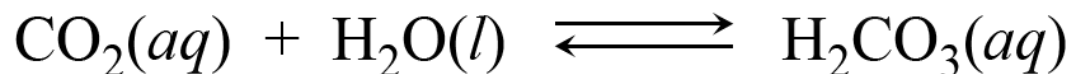
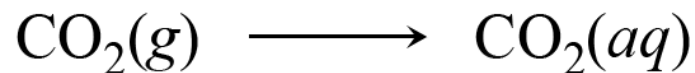






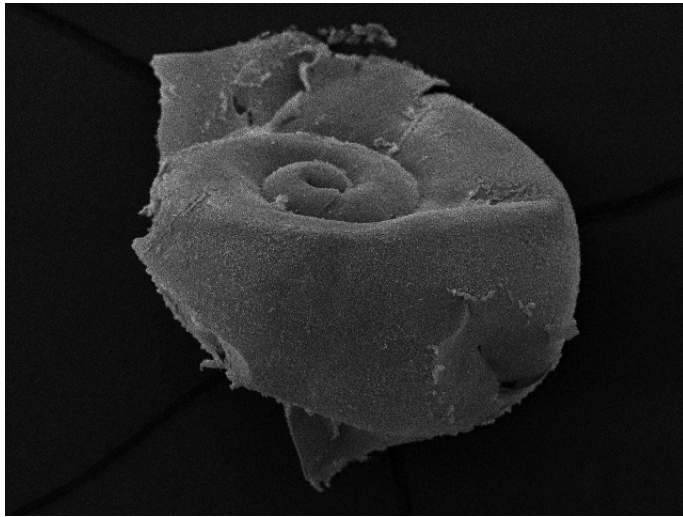
Chirality



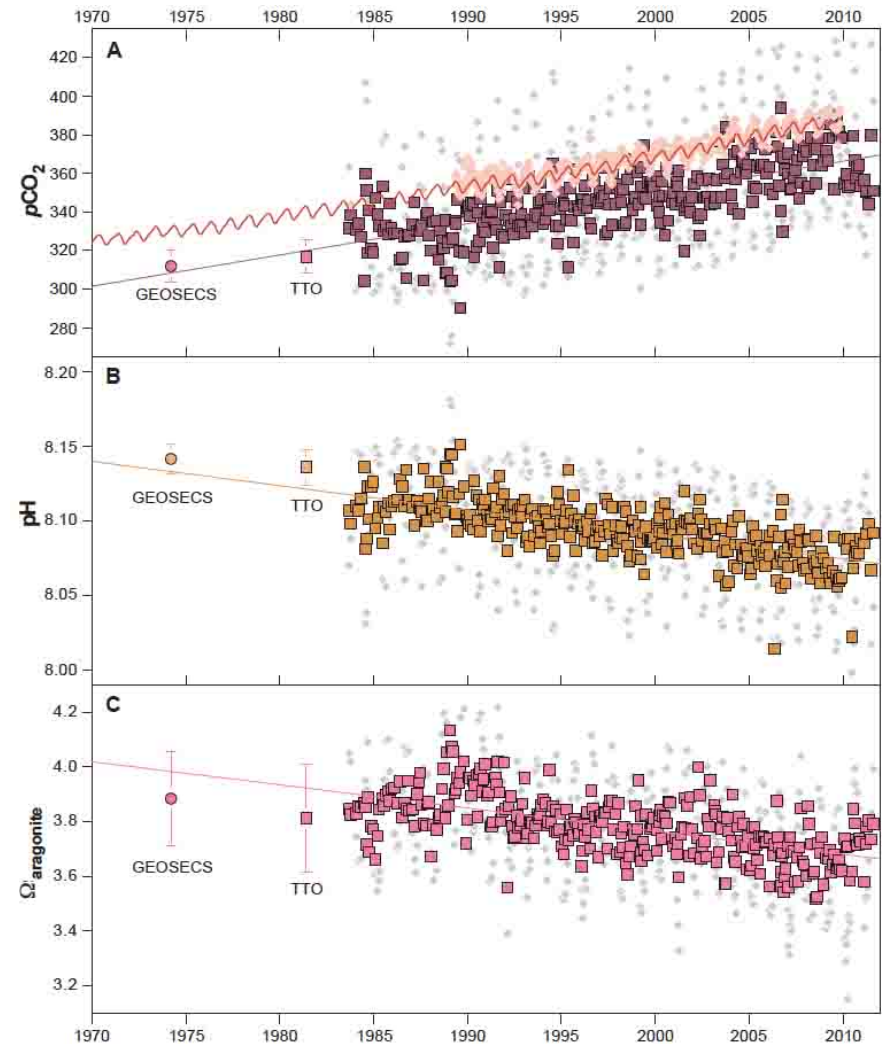


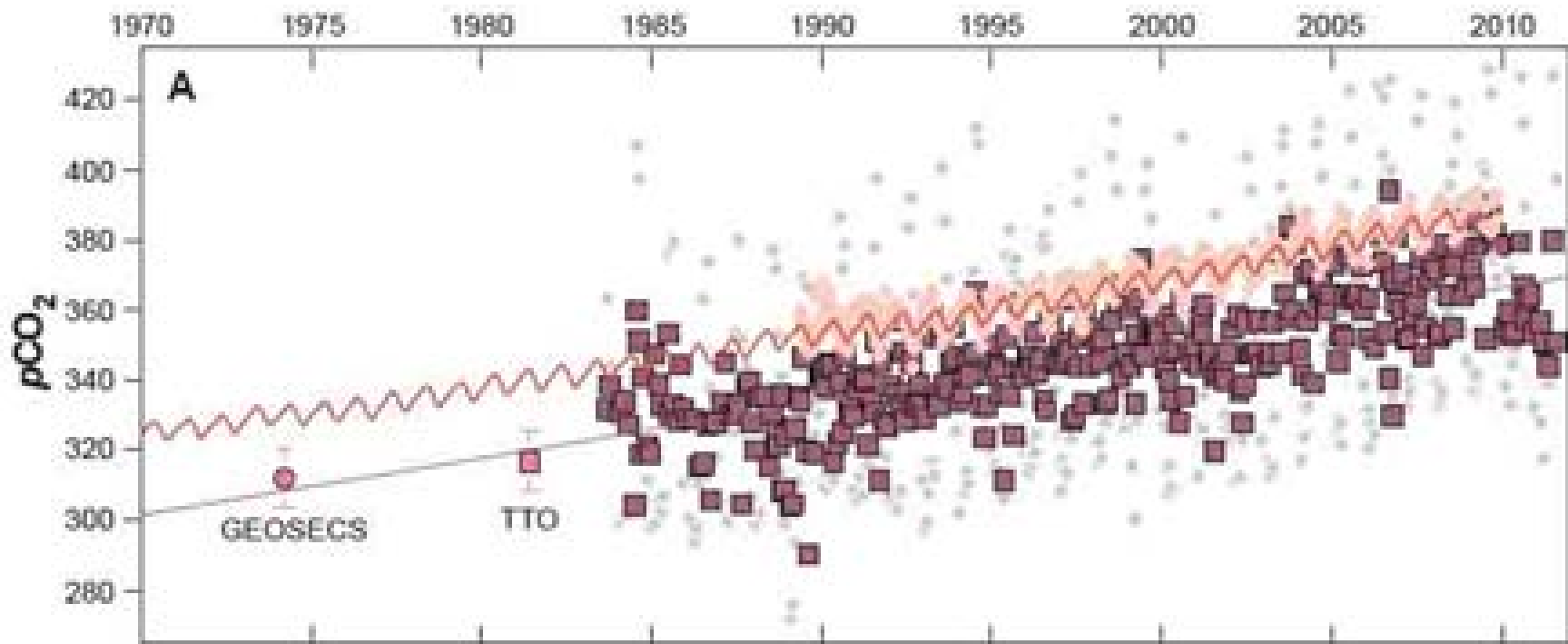
Our planet has changed and continues to do so.

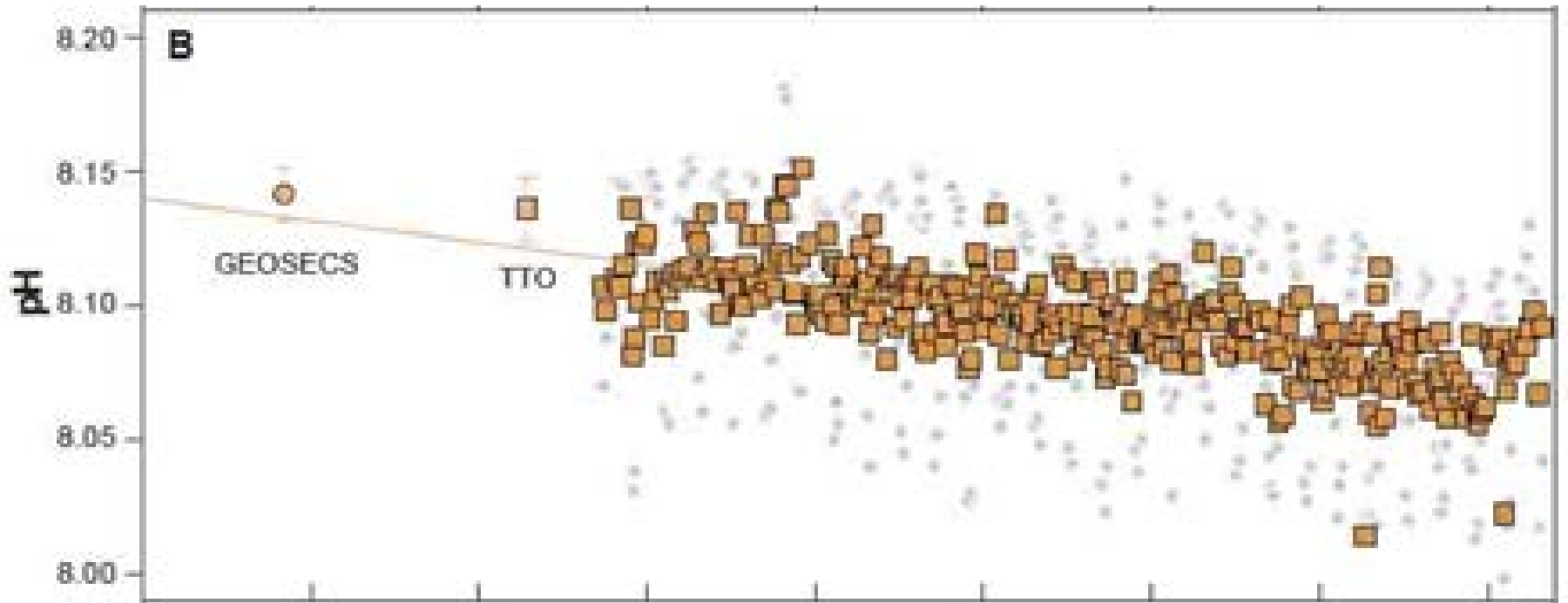
Oceans have acidified.



This marine snail from the ocean near Antarctica shows extreme shell dissolution due to ocean acidification.



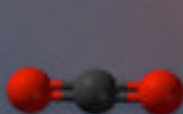




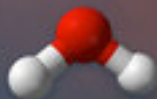
OCEAN ACIDIFICATION

HOW WILL CHANGES IN OCEAN CHEMISTRY AFFECT MARINE LIFE?

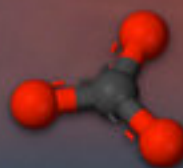
CO₂ absorbed from the atmosphere



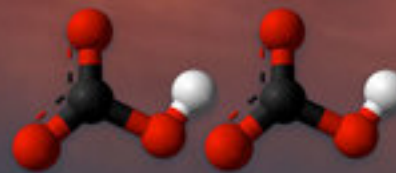
carbon dioxide



water



carbonate ion



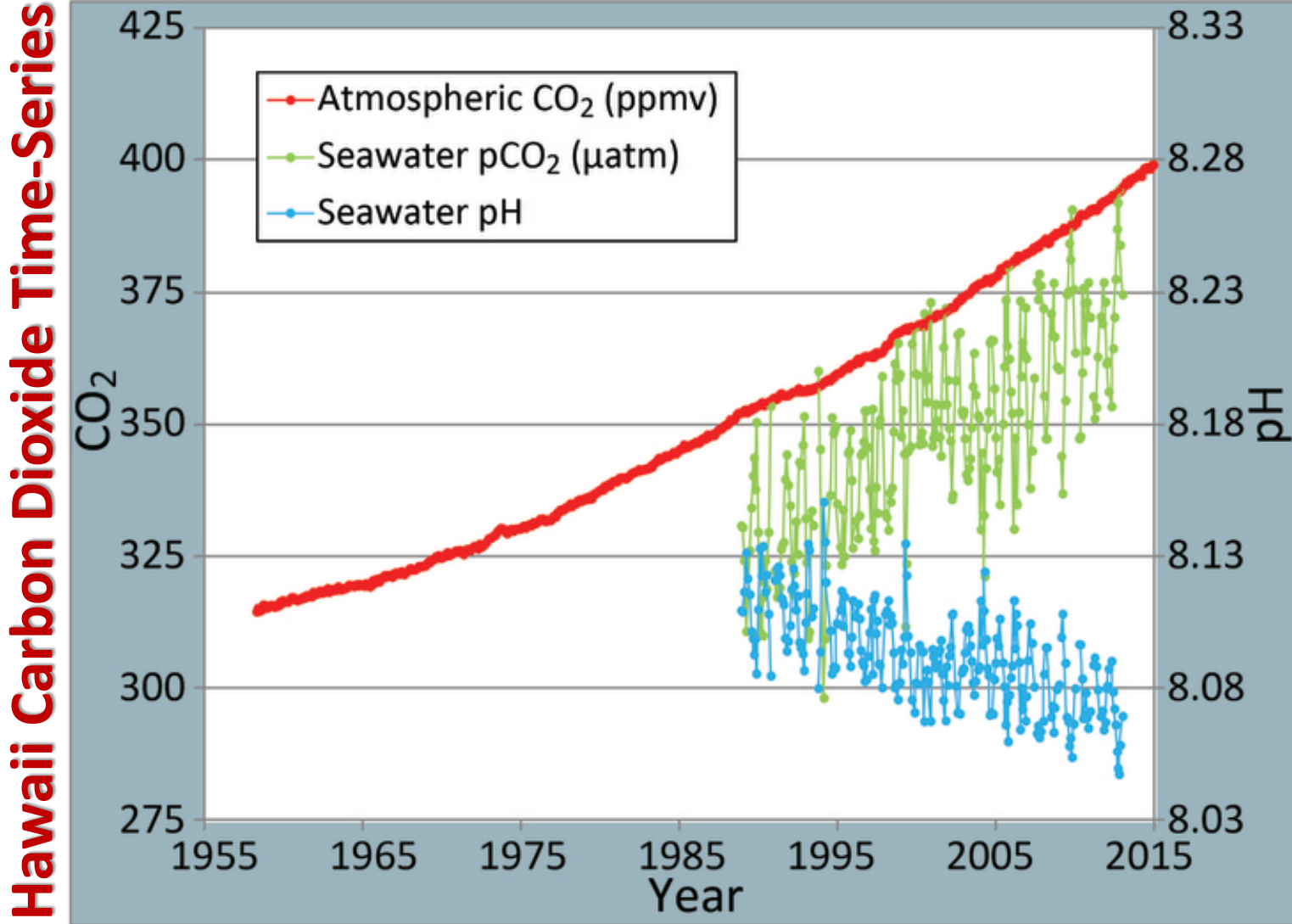
2 bicarbonate ions

consumption of carbonate ions impedes calcification

Source: pmel.noaa.gov



Wisconsin Initiative for
Science Literacy



Source: pmel.noaa.gov

This graph shows the correlation between rising levels of carbon dioxide (CO₂) in the atmosphere at Mauna Loa with rising CO₂ levels in the nearby ocean at Station Aloha. As more CO₂ accumulates in the ocean, the pH of the ocean decreases. (modified after R. A. Feely, Bulletin of the American Meteorological Society, July 2008).

NUTRITION FOR YOUR HEALTH

SUSAN NITZKE, PHD, RD
PROFESSOR EMERITA
UW-MADISON

