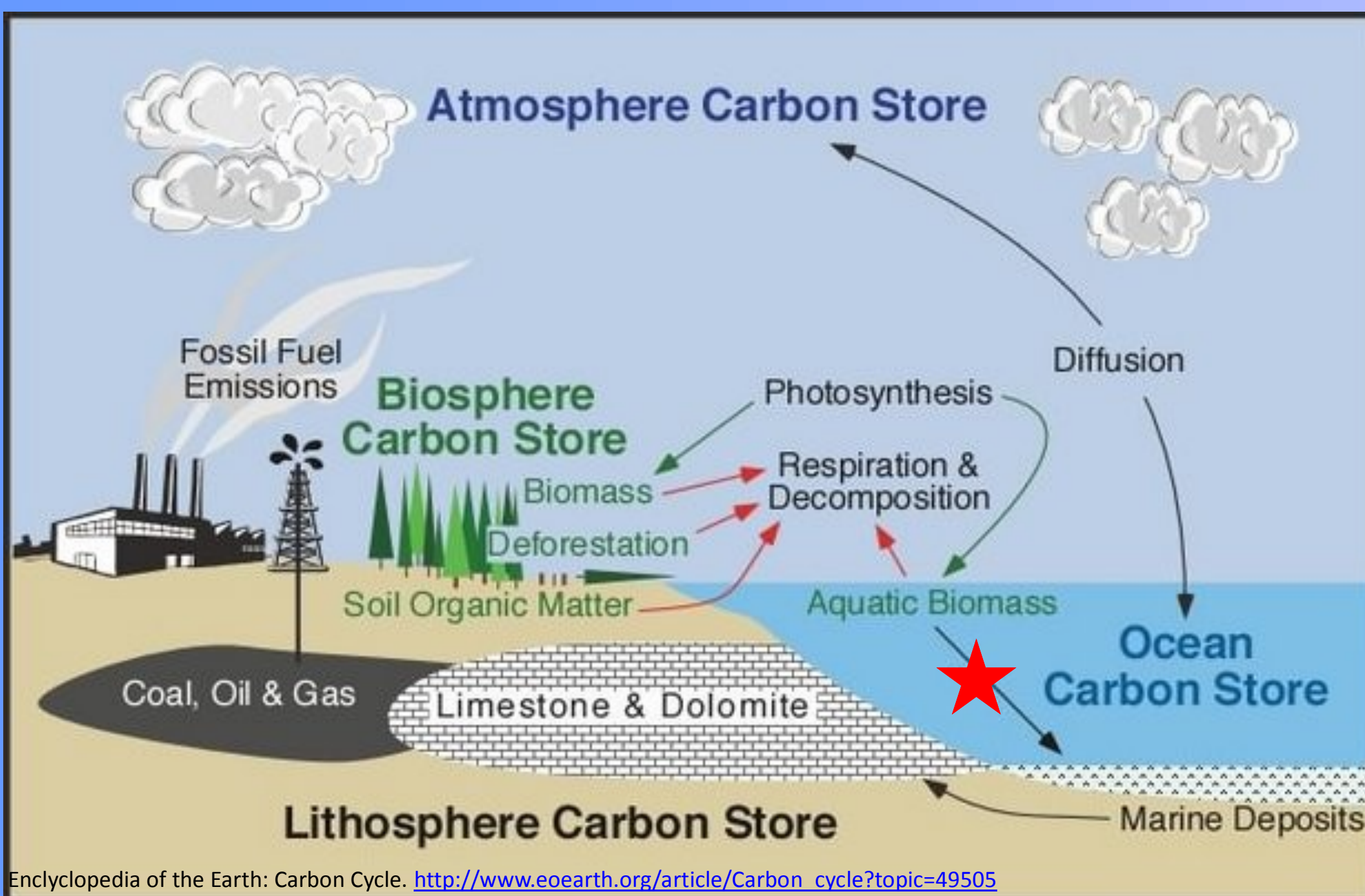


## Abstract

Salp blooms are important and generally understudied components of the carbon cycle. Salp blooms of the northwestern Atlantic are particularly poorly studied. Using primary source non-science-oriented newspapers, we will attempt to supplement the poor data on salp blooms of the region.

## Introduction

Salps (Family: Salpidae) are a group of holoplanktonic pelagic tunicates. Salps can reproduce extremely quickly and will form massive blooms, which have been documented throughout the world's oceans. Blooms generally correlate with areas of extremely high productivity associated with upwelling and phenomena producing nutrient rich water (Kremer 2002). Large blooms will consume large quantities of plankton and the fast-settling feces of the salps effectively sequesters carbon; so much so, that some have suggested salp populations might be manipulated to combat high anthropogenic carbon dioxide levels, and therefore high acidity, in the ocean (Kithil 2006). This also makes salps an essential part of the carbon cycle (see below, red star indicates where salps fit in).



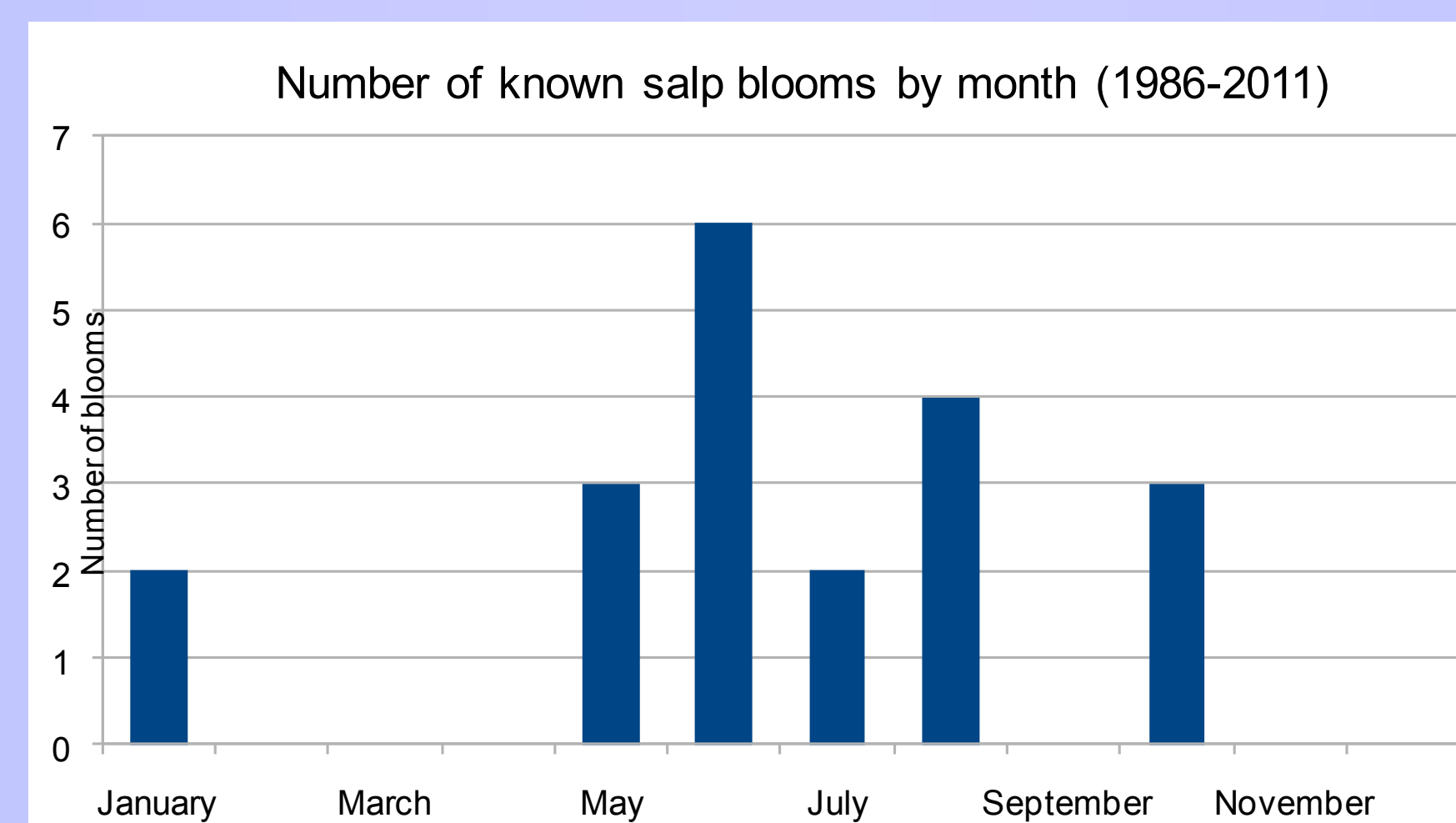
Blooms are occasional occurrences in the northwestern Atlantic, and exclusively off-shore blooms may have been overlooked. Since salps are planktonic, the currents would play the primary role in determining whether the north-salps arrive on the beach, and, with more data and further study, a mathematical model could likely be produced. Another possible shortcoming of the data is the lack of quantities. One might raise the question of what constitutes a bloom; certainly a few dozen washed-up salps do not constitute a bloom. As far as the authors know, this question is also unresolved.

It is therefore necessary to find an alternate source of data. Salp blooms are easily observable and occur infrequently enough to constitute “news”, and therefore the authors believe newspapers may have accurately documented salp blooms. Unfortunately, newspaper databases were unsearchable and an aggregate newspaper archiving service (NewsBank) was used.

## Results

We succeeded in extracting the following data from newspaper archives:

- August 9–12, 1998 (DeAngelis 1998, early date extrapolated from article; Lamon 1998; Rosenberg 1998)
- August 4, 1999 ("Jellyfish Are Back, Most Are Harmless." 1999)
- July 14, 2004 (DeAngelis 2004); August 29, 2004 (Bates 2004; unclear which report is accurate)
- October 5, 2007 ("At The Shore Today." 2007, likely small bloom)
- July 31–August 7, 2009 (Ianieri 2009, early date extrapolated from article)
- June 28–July 2, 2011 (Bergen 2011; Colimore 2011; Watson 2011)



## Discussion

The data produced comes with a serious caveat: it is based exclusively on beach observations. The fraction of blooms reaching the beach is unknown and exclusively off-shore blooms may have been overlooked. Since salps are planktonic, the currents would play the primary role in determining whether the north-salps arrive on the beach, and, with more data and further study, a mathematical model could likely be produced. Another possible shortcoming of the data is the lack of quantities. One might raise the question of what constitutes a bloom; certainly a few dozen washed-up salps do not constitute a bloom. As far as the authors know, this question is also unresolved.

The data does present an interesting trend: *The Press of Atlantic City* documents a large number of salp blooms. This is perhaps because the newspaper serves a large city, with a large tourist population who would be unfamiliar with and alarmed by salps, and it is thus necessary to report on each bloom, no matter how minor. Reading these news articles also suggests a possible future data source: the log books of a beach patroller or lifeguard.

The overlap between the previously reported data and the newly collected data here is, unfortunately, small. Examining older newspaper archives might help to bridge this gap and provide more opportunity to demonstrate or refute the validity of authors' method comparing the two data sets. Overlap could also serve to clarify the question of what fraction of salp blooms arrive on the beach since the scientific data is taken at sea and the newspaper data on the beach. There is one instance where this might be examined: Madin observed a bloom in 2002, which is undocumented in the newspa-

pers, suggesting the bloom never reached land. From this we might conclude that not all salp blooms arrive on shore.

## Conclusion

We were able to gather some data on salp blooms, however the searched timeframe is relatively short. Furthermore, the lack of overlap between data collected via our method and conventionally collected data makes it difficult to assess our method's potential error. By searching further back in the archives of newspapers and exploiting other discussed data sources, it will be possible to make this assessment in the future. Using this new data and yet-to-be-obtained plankton population data, the original objective of the project—to examine correlation between salp and plankton blooms—could be fulfilled. The current data on salp blooms for the Eastern United States coast is poor and the lack of consistent, continuous data makes this study impossible as of now. Even those populations best studied—those off the coast of the Southern United States (Deibel 2009)—lack data for such a study.

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