Laboratoire de Glaciologie et Géophysique de l'Environnement

Séminaire

Lundi 10 Octobre 2016, 14h00
Salle L. Lliboutry, LGGE

Sally CLOSE

LOCEAN, Paris

Regional dependence in Arctic sea ice variability

Analyses of Arctic sea ice variability often employ large-scale (e.g. total Arctic sea ice extent) or long-term (e.g. linear trend) metrics, masking spatial and temporal scales of variability that may be important in understanding both overall sea ice behaviour and its interaction with the wider climate system. This issue motivates this work, in which the spatial and temporal scales of Arctic sea ice variability are analysed and their relevance evaluated with respect to related atmospheric and oceanic variability.
The long-term behaviour of Arctic sea ice is characterised, and found to have a strong regional signal, with differences of up to 20 years in the timing of onset of rapid sea ice loss across the Arctic region in summer and autumn, suggesting that regional-scale forcings are an important influence in determining long-term sea ice evolution. An EOF-based analysis of winter sea ice concentration similarly suggests that local forcing is the dominant influence in determining sea ice variability at interannual to interdecadal time scales in this season. The quadrupole phase structure associated with the first EOF mode, and interpreted by previous studies to describe co-variability amongst the marginal seas, is found not represent a significant relationship amongst all seas. In particular, the Labrador Sea does not co-vary with the other regions. Hypothesised forcing mechanisms will be discussed, with a particular focus on the Siberian High, which appears to play an important role in determining sea ice variability at multiple time scales. The temporal evolution is strongly characterised by low-frequency variability, having time scales comparable to the present length of the satellite record; caution should thus be applied in the interpretation of long-term behaviour in records that may not yet fully resolve such variability.