LEVEL 2: BE INTERESTING.

THESE ARE YOUR FRIENDS.
(OR COLLEAGUES.)
LEVEL 2: BE INTERESTING.

THESE ARE YOUR FRIENDS. (OR COLLEAGUES.)

They want to support you but don’t want to be bored.
LEVEL 2:
BE INTERESTING.
Level 2: Be interesting.

1. Wow with a title.
2. Big images, simple graphs.
3. Pull quotes, kickers, etc.
POINTS OF ENTRY
POINTS OF ENTRY
POINTS OF ENTRY

TITLE
HEADINGS
IMAGES
GRAPHS

CAPTIONS
KICKERS
PULL QUOTES
LEVEL 2: BE INTERESTING.

WOW WITH A TITLE.
These Little Guys Eat Asphaltenes During Starvation
Hossein Jahromi
Department of Biological Engineering, Utah State University

Background
Utilization of plastic containers caused severe environmental concerns. Application of microorganisms for environmental remediation was proposed 100 years ago. Beckam, 1926, brought microorganisms into petroleum field on EOR purpuses.

Research Abstract

**Bacteria Isolation**

**Asphaltene Extraction**

**Static Condition**

**Shaking Condition**

**Experimental Analysis**

**Mathematical Analysis (DE method)**

**Asphaltenes are Biodegradable**

**Identified Species**

<table>
<thead>
<tr>
<th>Gram-test</th>
<th>Growth condition</th>
<th>Accession number</th>
<th>Source</th>
<th>Species type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gram negative</td>
<td>Anaerobic</td>
<td>EU403072</td>
<td>Shiraz Refinery Oil-contaminated Soil</td>
<td>Pseudomonas fluorescens</td>
</tr>
<tr>
<td>Gram negative</td>
<td>Anaerobic</td>
<td>JS7401462</td>
<td>Refinery Oil-contaminated Soil</td>
<td>Enterobacter Cloacae</td>
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<tr>
<td>Gram negative</td>
<td>Anaerobic</td>
<td>GQ426233</td>
<td>Shiraz Refinery Oil Sludge</td>
<td>Enterobacter Cloacae</td>
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<tr>
<td>Gram positive</td>
<td>Aerobic</td>
<td>DQ771568</td>
<td>Assayhue Refinery Contaminated Soil</td>
<td>Bacillus licheniformis</td>
</tr>
<tr>
<td>Gram negative</td>
<td>Anaerobic</td>
<td>JN575344</td>
<td>Assayhue Refinery Oil Sludge</td>
<td>Bacillus firmus</td>
</tr>
<tr>
<td>Gram negative</td>
<td>Anaerobic</td>
<td>AE004091</td>
<td>Assayhue Refinery Oil Sludge</td>
<td>Pseudomonas aeruginosa</td>
</tr>
</tbody>
</table>

**Biodegradation Results**

Biodegradation was proportional to initial asphaltene concentration. Asphaltene biodegradation is of higher rate under shaking condition in comparison with static condition. Asphaltene structure plays a central role in biodegradability according to FT-IR spectra. Asphaltene biodegradation data in all experiments fitted to Tessier kinetic model. Investigation of asphaltene biodegradation in different environmental media such as sea water and soil. Assessment of asphaltene biodegradation mechanism and identification of reaction pathways.

**Conclusions**

- Biodegradation was proportional to initial asphaltene concentration
- Asphaltene biodegradation is of higher rate under shaking condition in comparison with static condition
- Asphaltene structure plays a central role in biodegradability according to FT-IR spectra
- Asphaltene biodegradation data in all experiments fitted to Tessier kinetic model

**Future Works**

- Investigation of asphaltene biodegradation in different environmental media such as sea water and soil
- Assessment of asphaltene biodegradation mechanism and identification of reaction pathways

**Objectives**

1. Isolation of microorganisms that are capable of degrading asphaltenes
2. Assessment of biodegradability of asphaltenes under shaking and static conditions
3. To study the kinetics of asphaltene biodegradation

hossein.jahromi@aggiemail.usu.edu
These little guys eat asphaltenes during starvation.
Investigating mesospheric gravity wave dynamics over McMurdo Station, Antarctica (77° S)

Jonathan R. Pugmire, Mike J. Taylor, Yucheng Zhao, P.-Dominique Pautet
Center for Atmospheric and Space Sciences, Utah State University

Introduction

The Antarctic Gravity Wave Instrument Network (ANGWIN) is an NSF sponsored international program designed to develop and utilize a network of gravity wave observatories utilizing existing and new instrumentation operated at several established research stations around the continent. Utah State University’s Atmospheric Imaging Lab operates all-sky infrared imagers at several research stations. Here we present novel measurements of short-period and large-scale mesospheric gravity waves. Imaging during 2012 from McMurdo Station (77°8’S, 166°7’E) on Ross Island. This IR camera has operated at Arrival Heights alongside the University of Colorado Fe Lidar during the past three winter seasons (March–September 2012–2014). Two primary goals are:

• Quantify the properties of small- and medium-scale mesospheric gravity wave climatology over this region of Antarctica.
• Combine results with similar measurements from other ANGWIN stations to investigate continental-wide gravity wave dynamics (see SA318–4100).

IR Imaging

All-sky observations of the OH emission layer (~87 km) were made using an infrared (0.9-1.7 μm) cooled InSb camera. The OH airglow emissions are much stronger in the infrared region (~1 μm), as shown in blue in the figure to the right, and we use new InSb cameras to obtain high-quality short-exposure images of gravity waves under auroral and full moon observing conditions.

Raw all-sky (180°) OH image data were recorded every 10 s with a 3 s exposure enabling detailed measurements of individual gravity wave events.

(a) Raw image oriented using the IR star field.

(b) Stars removed.

(c) Flat fielded: Average nightly image subtracted.

(d) Unwarped to 350 x 280 km geographic grid at 87 km altitude.

Gravity waves were analyzed using well-developed Fourier analysis techniques to determine direction of propagation (θ), horizontal wavelength (A), observed horizontal phase speed (v) and wave period (T) (e.g. Taylor, et al, 1997).

During the 2012 observing period (March–September, nighttime hours) at McMurdo over 400 short-period (<1 hr) gravity wave events were observed.

Three Continuous Days in June

In mid-winter there is continuous darkness at McMurdo. From June 23–26, 2012 (day 175–178) over 40 small-scale gravity wave events were analyzed during 73 continuous hours of observations. Their properties are shown in the figures below.

The four unwarped images above show example 350 x 280 km airglow images taken on day 176 every 15 minutes revealing both the high level of wave activity and quality of the images. Several wave features are highlighted as they propagate through the images. The blue and green lines can also be seen in keogram data below, wave event 1.

Small-Scale Gravity Waves

Both large- and small-scale gravity wave features can be studied by creating keograms. A keogram is made by stacking vertical (and horizontal) slices through the center of each image together to form a time series revealing wave activity as a function of time. The large keograms along the bottom of the poster shows 73 continuous hours of wave data starting (day 175, 01:33 UT to day 178, 03:09 UT).

These data illustrate the high quality of our gravity wave measurements from Antarctica.

Summary: 2012 Wave Parameters

The data show evolution from NW propagation (307 events) in the fall which expands to NE and SW wave motions during mid-winter (110 events). The late winter was dominated by many events (302 events) again exhibiting strong NE and SW motions but more isotropic than earlier. The strong asymmetries are suggestive of localized sources.

Wave Event #1: Day 176, 15:30-19:00

T = 8.3 min

ν = 44 ± 5 m/s

Wave Event #2: Day 177, 16:50-20:00

T = 10 ± 3 min

ν = 42 ± 5 m/s

Future Work

For ongoing measurements from the South Pole station in combination with other ANGWIN sites will be used to investigate pan-Antarctic anisotropy and wave parameters.

New analysis of McMurdo data from 2013 and 2014 data will further clarify the asymmetries in the wave propagation at this site for understanding the climatology of gravity waves observed at McMurdo.

Comparison with onsite Fe Boltzmann Lidar measurements and MF radar wind measurements.

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Two Awesome Weeks in August

Three Continuous Days in June
LEVEL 2: BE INTERESTING.

1. WOW WITH A TITLE.
2. BIG IMAGES, SIMPLE GRAPHS.
Abstract
Implementing crosscutting concerns for transactions is difficult, even using Aspect-Oriented Programming Languages (AOPL) such as AspectJ. Many of these challenges are because the context of transaction-related crosscutting concern is often a context consisting of loosely-coupled abstractions like dynamically generated identifiers, timestamps, and tentative value sets for distributed resources. Current AOPL do not provide joinpoints and pointcutks for weaving of advice into high-level abstractions, like transactions. Other challenges stem from essential complexity in the nature of the data, operations on the data, or the volume of data, and accidental complexity comes from the way that the problem is being solved even using common transaction frameworks. This paper describes an extension to AspectJ, called TransJ, with which developers can implement transaction-related concerns in cohesive and loosely-coupled aspects. It also presents a preliminary experiment that we hope will provide evidence of improvement in reusability without sacrificing performance of applications requiring transactions.

Contributions
- A Unified Model for Joinpoints in Distributed Transactions (UMIDT) that is rich enough to describe any transaction-related joinpoints and context information that make the most sense for DTPSs.
- A design and implementation of TransJ, including an implementation of UMIDT and JTA model.
- A toolkit consisting of reusable transaction aspects for common transaction-related crosscutting concerns, which verifies the correctness of UMIDT design. Such as performance measuring, logging, exception handling, audit trails, and tracing.
- A demonstration of the feasibility and utility of TransJ and a reusable aspect library through the implementation of DTAs and transaction aspects for those applications.
- An extension to a quality model to measure the effectiveness of TransJ in comparison with AspectJ.
- A preliminary experiment to test our hypotheses to discover whether TransJ can help achieve improved reusability without sacrificing performance when a system involved transaction-related crosscutting concerns.

TransJ Architecture
The core TransJ infrastructure layer enables aspect-oriented developers to treat transactions as first-class concepts into which AspectJ framework can weave crosscutting concerns in a modular way, i.e., transaction aspects.

Extended Quality Model for Transactional Applications (EQMTA)
Transaction Events and Possible Joinpoints

Limited Quality Model for Transactional Applications (EQMTA)

Limitations of AspectJ
- In AspectJ, joinpoints only deal with execution-flow context, e.g., the calling object, target object, and call stack.
- In AspectJ pointcuts can only express possible joinpoints in terms of basic program structures, like methods, constructors, fields, etc.
- AspectJ does not inherently handle application-level context, a transaction, which may be tied to runtime objects used by multiple execution threads or processes.

Initial Theoretical Comparison of TransJ to AspectJ
- Better Abstractions for Transactions.
- Improved the Reusability.
- Joinpoint Model Formalizes Transactional Joinpoints.
- Improved Modularity and Avoiding.
- Better Ways to Detangle Transaction Constructs from Core Application.
- Easy to Code Transaction Concerns.
- Conceptual Model Captures Transaction Context Information.
- More Structured Concerns for Transactions.

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Achieving Good Quality Software

Objectives

- Achieving Good Quality Software

- TransJ Framework-Independent abstractions for Weaving Crosscutting Concerns into Distributed Transactions in AspectJ

- An extension to AspectJ to weave transaction-related crosscutting concern into a DTPS in a modular and reusable way, while preserving the performance, core functionality, and observability to those concerns.

Sample of Crosscutting Concerns

- In AspectJ, joinpoints only deal with execution-flow contexts, e.g., the calling object, target object, and call stack.
- In AspectJ, pointscuts can only express possible joinpoints in terms of basic program structures like methods, constructors, fields, etc., and Aspect does not inherently handle application-level contexts, like a transaction, which may be tied to runtime objects used by multiple execution threads or processes.

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- Improved Modularity and Observability.
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- Easy to Code Transaction Concerns.
- Conceptual Model Captures Transaction Context Information.
- More Structured Concerns for Transactions.

Design of TransJ Tool Set

- Transaction Joinpoints and Base Aspects within the Scope of the Transaction's Contexts

- Operation Joinpoints and Base Aspects within the Scope of the Operation's Contexts

- Resource Joinpoints and Base Aspects within the Scope of the Lock's Contexts

Extended Quality Model for Transactional Applications (EQMTA)

References

Experiment Methodology

Phase 1:
1. Passing the online Human Research Training course offered through the Collaborative Institutional Training Initiative (CITI).

2. Experimental Approval: Submitting IRB Application

3. Selection of Sample Applications: Developing three simple software applications and documenting their requirements, design, and implementation

4. Selection of Crosscutting Concerns from Sample Applications.

5. Sending invitation letters and recruiting up to 10 developers and organized them into two groups: group 1 & group 2

6. Assessing participants skill levels using questionnaires and surveys

7. Providing JTA, and JBoss Application Server training to developers in Group 1, and 2, and have them work through some practice applications.

8. Providing AspectJ training to Group 1 participants.

9. Providing TransJ training to developers in Group 2, and have them work through some practice applications.

Phase 2:
10. Asking participants to develop programs using given set of requirements

11. Asking the developers to complete a pre-implementation questionnaire, once they understand the code and documentation, provided them in Steps 7,8,9, and 10

12. Asking the developers to develop the three crosscutting concerns, and then collecting their implementations using GitHub repository, and Box-file sharing

13. Asking the developers to complete a post-questionnaire that helps to gather some additional information to measure quality metrics.

14. Measuring the quality metrics using EQMTA, collecting findings from the logs and pre/post-questionnaires from Phase 1

Phase 3:
15. Giving enhancements (sample applications and crosscutting concerns) to all developers, have them revise their implemented concerns, and then collect those revised implementations.

16. Asking the developers to complete a questionnaire that helps to gather some additional information to measure quality metrics.

17. Measuring Dependent Variables using Reuse/Performance Metrics

18. At the end; interpreting the results.
Experiment Methodology

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SELF-ADVOCACY IN CHILDREN WITH HEARING LOSS

Hearing Technology Management
- wears technology
- takes technology on/off independently
- checks and replaces batteries
- notifies teacher of technology trouble
- performs visual inspection of technology
- engages in Ling 6 sound test

Proactive Listening
- seeks to improve listening environment
- seats him/herself for best listening advantage

Social and Academic
- seeks clarification from peers and adults
- engages in class discussions and peer interactions
- can explain hearing loss and technology results

Recommendations

Children benefit when teachers foster age-appropriate self-advocacy skill development in their students across all self-advocacy priority areas and remain mindful that the level of self-advocacy skills attained in early childhood serve as a foundation for later success.

Children benefit when teachers utilize proper tools to identify areas of weakness in their students’ level of self-advocacy skills and consciously incorporate them into IEP goal development and classroom instruction.
SELF-ADVOCACY SKILLS

INTRODUCTION

Self-advocacy is an essential component of social-emotional skill development. For children who are deaf or hard of hearing (DHH), self-advocacy is considered especially critical, as the broader population is not always understanding of their needs. Regardless of the severity of loss, all children who are DHH need to demonstrate the ability to self-advocate across settings and may require additional support in developing these skills. Age-appropriate self-advocacy skills can and should be introduced within early intervention home-based programs and within the preschool classroom to establish the foundation for future growth and development.

METHODS

A self-advocacy ratings questionnaire for young children who are DHH was developed and distributed to preschool through third-grade listening & spoken language teachers. Participants included 12 teachers who offered their perceptions on the self-advocacy skills of their students with hearing loss (n = 64).

Teachers completed both quantitative and qualitative survey components that revealed information on:
- student skill level in hearing technology management, social and academic self-advocacy skills and proactive listening.
- frequency and type of self-advocacy goals listed in student Individualized Education Programs (IEPs)
- self-advocacy skills taught within the classroom
- impact of self-advocacy skill level on academic and social/ emotional development
- teacher recommendations for fostering self-advocacy skill development.

RESULTS

Teacher perceptions of skill level increased from preschool to kindergarten across all three self-advocacy priority areas (see inset).

Skill level was generally higher in areas of self-advocacy that required a lower level of skill. Skills that required higher levels of responsibility, greater expressive communication or interaction with others were identified as general areas of weakness.

27% of students were reported to have self-advocacy goals written in their IEPs.

64% of students experienced negative effects on their academic and social/ emotional development as a direct result of their self-advocacy skills.

For teachers who incorporated self-advocacy skills into their classroom instruction, a majority indicated that they focused on skills that required a lower level of responsibility or technical skill (e.g., consistent wearing of hearing technology, taking technology on/off), while very few identified more difficult skills as part of their curriculum (e.g., FM system responsibility, visual inspection of technology).

RECOMMENDATIONS

Children benefit when teachers foster age-appropriate self-advocacy skill development in their students across all self-advocacy priority areas and remain mindful that the level of self-advocacy skills attained in early childhood serve as a foundation for later success.

Children benefit when teachers utilize proper tools to identify areas of weakness in their students’ level of self-advocacy skills and consciously incorporate them into IEP goal development and classroom instruction.

SELF-ADVOCACY IN CHILDREN WITH HEARING LOSS

<table>
<thead>
<tr>
<th>Self-Advocacy Priority Area</th>
<th>Hearing Technology Management</th>
<th>Social and Academic</th>
<th>Proactive Listening</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>wears technology</td>
<td>seeks to improve listening environment</td>
<td>engages in Ling 6 sound test</td>
</tr>
<tr>
<td></td>
<td>takes technology on/off independently</td>
<td>seats himself/herself for best listening</td>
<td></td>
</tr>
<tr>
<td></td>
<td>checks and replaces batteries</td>
<td>notifies teacher of technology trouble</td>
<td></td>
</tr>
<tr>
<td></td>
<td>notifies teacher of technology trouble</td>
<td>performs visual inspection of technology</td>
<td></td>
</tr>
<tr>
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<td></td>
</tr>
</tbody>
</table>

Ariel Hendrix, B.S. (M.Ed. Candidate) & Lauri Nelson, Ph.D.

“Children with hearing loss should learn that they have a right and responsibility to access the same educational and social experiences as their peers.”
Self-Advocacy in children with hearing loss

Hearing Technology Management
- wears technology without resistance
- takes technology on/off independently
- notifies teacher of technology trouble
- replaces battery independently
- visual inspection of technology
- reminds teacher to do listen check

Proactive Listening
- seeks to improve listening environment
- seats for best listening/visual advantage

Social and Academic Self-Advocacy
- seeks clarification from peers
- engages in class discussions
- can explain role of hearing technology

Skill levels

Introduction

Methods

A self-advocacy ratings questionnaire for young children who are DHH was developed and distributed to preschool through third-grade listening & spoken language teachers. Participants included 12 teachers who offered their perceptions on the self-advocacy skills of their students with hearing loss (n = 64). Teachers completed both quantitative and qualitative survey components that revealed information on:
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- impact of self-advocacy skill level on academic and social/emotional development,
- teacher recommendations for fostering self-advocacy skill development.

Teacher perceptions of skill level increased from preschool to kindergarten across all three self-advocacy priority areas (see inset). Skill level was generally higher in areas of self-advocacy that required a lower level of skill. Skills that required higher levels of responsibility, greater expressive communication or interaction with others were identified as general areas of weakness.

For teachers who incorporated self-advocacy skills into their classroom instruction, a majority indicated that they focused on skills that required a lower level of responsibility or technical skill (e.g., consistent wearing of hearing technology, taking technology on/off), while very few identified more difficult skills as part of their curriculum (e.g., FM system responsibility, visual inspection of technology).

Children benefit when teachers utilize proper tools to identify areas of weakness in their students' level of self-advocacy skills and consciously incorporate them into IEP goal development and classroom instruction. Children benefit when teachers foster age-appropriate self-advocacy skill development in their students across all self-advocacy priority areas and remain mindful that the level of self-advocacy skills attained in early childhood serve as a foundation for later success.

27% of students experienced negative effects on their academic and social/emotional development as a direct result of their self-advocacy skills. 64% of students were reported to have self-advocacy goals written in their IEPs.

The following graphs indicate the frequency that each skill was mostly or always exhibited across age-groups:

Self-advocacy is an essential component of social-emotional skill development. For children who are deaf or hard of hearing (DHH), self-advocacy is considered especially critical, as the broader population is not always understanding of their needs. Regardless of the severity of loss, all children who are DHH need to demonstrate the ability to self-advocate across settings and may require additional support in developing these skills. Age-appropriate self-advocacy skills can and should be introduced within early intervention home-based programs and within the preschool classroom to establish the foundation for future growth and development.
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Recommendations

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Self-advocacy is an essential component of social-emotional skill development. For children who are deaf or hard of hearing (DHH), self-advocacy is considered especially critical, as the broader population is not always understanding of their needs. Regardless of the severity of loss, all children who are DHH need to demonstrate the ability to self-advocacy.
Thermospheric Gravity Wave Characteristics Obtained Using the Poker Flat Incoherent Scatter Radar

Michael R. Negale1, Kim Nielsen2, Michael J. Taylor1, and Michael J. Nicolls3
1Utah State University, 2Utah Valley University, 3SRI International

Introduction
Recent observational and modeling studies have revealed the importance of gravity waves propagating into the thermospheric region (~110 – 400 km) as they contribute significantly to changes in both winds and temperatures [e.g., Vadas and Fritts, 2005]. The distributions and variability of these thermospheric gravity wave parameters are not yet known.

This presentation: details the process of obtaining wave parameters from the Poker Flat Incoherent Scatter Radar (PFISR) [based on a method developed by Nicolls and Heinselman [2007]) and presents preliminary wave characteristic distributions from August 2011 – 2014.

• From the Nicolls and Heinselman [2007] case study:
  - horizontal wavelength of ~187 km
  - phase speed of ~140 m/s
  - period of ~22 min
  - propagating “150” from north

• Propagation distributions from this analysis are compared to previous results of TIDs made using SuperDARN radars.

• Wave lengths vs. periods are compared with results obtained with a co-located mesospheric airflow imager.

PFISR Data Analysis

PFISR
The Poker Flat Incoherent Scatter Radar (PFISR) facility, is operated at the Poker Flat Research Range (PFRR) (65°N, 147°W) near Fairbanks, Alaska. PFISR has operated since 2007 and uses a phased array technique enabling rapid pulse-to-pulse steering.

Simultaneous observations from different parts of the ionosphere allows measurements of all relevant properties of the observed gravity waves, including their periods, horizontal and vertical wavelengths, horizontal phase speeds, and propagation directions [e.g. Nicolls and Heinselman, 2007] to be obtained. The wave parameters obtained for this analysis are extracted from electron density measurements.

Results

• In order to investigate the monthly wave propagation distributions for the MSTIDs, we combined waves from 2010 – 2013 (total 33 months) into a single year and plotted them by month in 30° wide bins. For comparison, all data, except March and October, are plotted on the same scale.

• In each month the wave motions are predominantly southeastward.

• Variability in the wave propagation ranged from northeastward to southwestward.

• More waves were observed during the winter months with least occurrence in June and July.

• Remarkably no waves propagating in the northwest sector.

Summary/Future Work

• The majority of the high phase speed (>500 m/s) waves (black lines) are propagating towards the east.

• The lower phase speed (< 500 m/s) MSTIDs (red lines) are seen to be propagating towards the east and southeast.

• Atmospheric gravity wave parameters were extracted from measured electron densities obtained from a number of different PFISR experiments run from August 2011 – 2013.

• Over 500 MSTIDs were detected over the altitude range 100-300 km exhibiting well defined wave characteristics and dominant propagation directions towards the southeast.

• These propagation directions were found to be similar to other results obtained from SuperDARN radars in Alaska and Virginia.

• Wavelengths vs. periods from PFISR and a co-located all-sky imager also agree with previous results.

Future work:
- Investigate wave characteristic as a function of altitude in 50 km altitude ranges from 100 – 300 km
- Use spectral analysis to investigate other wave characteristics.

Acknowledgments
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Historic observation and modeling studies have revealed the importance of gravity waves propagating into the thermospheric region (~110 – 400 km) as they contribute significantly to changes in both winds and temperatures [e.g., Vadas and Fritts, 2005]. The distributions and variability of these thermospheric gravity wave parameters are not yet known.

This presentation details the process of obtaining wave parameters from the Poker Flat Incoherent Scatter Radar (PFISR) (based on a method developed by Nicolls and Heinselman [2007]) and presents preliminary wave variability of changes in both winds and temperatures over this altitude range. This data was obtained using the SuperDARN radar.

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• From the Nicolls and Heinselman (2007) case study:
  - horizontal wavelength of ~187 km
  - phase speed of ~140 m/s
  - period of ~22 min
  - propagating “~150” from north

• Propagation distributions from this analysis are compared to previous results of TIDs made using SuperDARN radars.
• Wavelengths vs. periods are compared with results obtained with a co-located mesospheric airglow imager.

PFISR Data Analysis

The Poker Flat Incoherent Scatter Radar (PFISR) facility is operated at the Poker Flat Research Range (PFRR) (65° N, 147° W) near Fairbanks, Alaska. PFISR has operated since 2007 and uses a phased array technique enabling rapid pulse-to-pulse steering.

Simultaneous observations from different parts of the ionosphere allow measurements of all relevant properties of the observed gravity waves, including their periods, horizontal and vertical wavelengths, horizontal phase speeds, and propagation directions (e.g., Nicolls and Heinselman, 2007) to be obtained. The wave parameters obtained for this analysis are extracted from electron density measurements.

PFISR

Location of PFISR in interior Alaska

PFISR situated at PFRR

Summary results: In the standard form of histogram plots for the horizontal wavelength, observed phase speed, and period are shown. The data are plotted for the combined 2010 – 2013 observations, with a total of 959 events. Note a number of very high speed events (black). In order to compare with published results, we consider waves with phase speeds <500 m/s (red bars, 528).
• Wavelengths range from 200-600 km with a median of ~473 km.
• Phase speeds range from 60-250 m/s, with a median of ~137 m/s.
• Periods ranged from ~4 to ~ 100 min, with a median of ~60 min.

In order to investigate the monthly wave propagation distributions for the MSTIDs, we combined waves from 2010 – 2013 (total 33 months) into a single year and plotted them by month in 30° wide bins. For comparison, all data, except March and October, are plotted on the same scale.
• In each month the wave motions are predominately southeastward.
• Variability in the wave propagation ranged from northeastward to southwestward.
• More waves were observed during the winter months with least occurrence in June and July.
• Remarkably no waves propagating in the northwest sector.

• The majority of the high phase speed (>500 m/s) waves (black lines) are propagating towards the east.
• The lower phase speed (<150 m/s) MSTIDs (red lines) are seen to be propagating towards the east and southeast.

Results

Discussion

measured electron densities obtained from a number of different PFISR experiments run from August 2010 – April 2013.
• Over 500 MSTIDs were detected over the altitude range 100-300 km exhibiting well defined wave characteristics and dominant propagation directions towards the southeast.
• These propagation directions were found to be similar to other results obtained from SuperDARN radars in Alaska and Virginia.
• Wavelengths vs. periods from PFISR and a co-located all-sky airglow image also agree with previous results.

Future work:
• Investigate wave characteristic as a function of altitude in 50 km altitude ranges from 100 – 300 km.
• Use spectral analysis to investigate other wave characteristics.

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Thermospheric Gravity Wave Characteristics Obtained Using the Poker Flat Incoherent Scatter Radar

Michael R. Negale¹, Kim Nielsen², Michael J. Taylor¹, and Michael J. Nicolls³
¹Utah State University, ²Utah Valley University, ³SRI International

Introduction
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PFISR Data Analysis

Summary results: In the standard form of histogram plots for the horizontal wavelength, observed phase speed, and period are shown. The data are plotted for the combined 2010–2013 observations, with a total of 595 events. Note a number of very high speed events (black). In order to compare with published results, we consider waves with phase speeds <500 m/s (red bars, 528).

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Future work:
- Investigate wave characteristic as a function of altitude in 50 km altitude ranges from 100 – 300 km.
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PFISR Data Analysis

Aim and elevation angles for each of the 4 beams utilized by PFISR for observations on 25 October 2011.

PFISR Data Analysis

Results

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Discussion

Ishida et al. [2008] made observations of TIDs using two SuperDARN radars located in Alaska from December 2003 – February 2007. They observed 134 events almost all propagating southwards, but no northeast propagation.

Ishida et al. [2008] made observations of mid-latitude TIDs using a SuperDARN radar located in Virginia (37°N) from June 2010 – May 2011. A majority of the observed TIDs were propagating towards the southeast at ~150°.

The propagation distribution of the TIDs obtained using PFISR show a majority of the waves to be propagating towards the southeast, similar to previous studies.

Rotation of TID phase speed

Summary/Future Work

• Atmospheric gravity wave parameters were extracted from measured electron densities obtained from a number of different PFISR experiments run from August 2010 – April 2013.
• Over 500 MSTIDs were detected over the altitude range 100-300 km exhibiting well defined wave characteristics and dominant propagation directions towards the southeast.
• These propagation directions were found to be similar to other results obtained from SuperDARN radars in Alaska and Virginia.
• Wavelengths vs. periods from PFISR and a co-located all-sky imager also agree with previous results.

Future work:
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EXPERIMENTING WITH BALL PUMP GATE
(An experiment about air pressure)

THE FRIDGE TEST
Room Temperature (°F) in Fridge (°C)

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THE FREEZER TEST
Room Temperature (°F) in Freezer (°C)

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THE OVEN TEST
Room Temperature (°F) in Oven (°C)

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Air Pressure

Experiment
We went to the store to get a kid’s football, an NCAA football, and an NFL football; plus a ball pressure gauge.

We put the balls at their right pressure. Then we put them in the fridge (30 degrees Fahrenheit) to see what would happen to them in cold weather. The kid’s ball went from 6 to 4 psi, the NCAA ball went from 8 to 6 psi, and the NFL ball went from 12 to 10 psi. They all went down 2 psi.

Next, we put the balls in the freezer (40 degrees Fahrenheit) for 2 hours. The kid’s ball went from 4 to 3 psi, the NCAA ball went from 6 to 5 psi, and the NFL ball went from 10 to 8 psi. They all went down 2 psi.

Finally, we put the balls in the oven (100 degrees Fahrenheit) for 2 hours. The kid’s ball went from 4 to 3 psi, the NCAA ball went from 6 to 5 psi, and the NFL ball went from 10 to 8 psi. They all went down 2 psi.

Questions:
1. Why does water change the force?
2. What would happen if there was no water jet?
3. What would happen if it were a hungry person?
4. What would happen if they were in a shape?

Applications:
- How heavy is an elephant?
- Is the crown made of pure gold?
Level 2: Be interesting.

1. Wow with a title.
2. Big images, simple graphs.
3. Pull quotes, kickers, etc.
Self-Advocacy in children with hearing loss

Hearing Technology Management
- wears technology
- takes technology on/off independently
- checks and replaces batteries
- notifies teacher of technology trouble
- performs visual inspection of technology
- engages in Ling 6 sound test

Proactive Listening
- seeks to improve listening environment
- seats him/herself for best listening advantage

Social and Academic
- seeeks clarification from peers and adults
- engages in class discussions and peer interactions
- can explain hearing loss and technology

Recommendations
Skill levels

Children with hearing loss should learn that they have a right and responsibility to access the same educational and social experiences as their peers.

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Recommendations

For teachers who incorporated self-advocacy skills into their classroom instruction, a majority indicated that they focused on skills that required a lower level of responsibility or technical skill (e.g., consistent wearing of hearing technology, taking technology on/off), while very few identified more difficult skills as part of their curriculum (e.g., FM system responsibility, visual inspection of technology).

27% of students were reported to have self-advocacy goals written in their IEPs.
64% of students experienced negative effects on their academic and social/emotional development as a direct result of their self-advocacy skills.

Children benefit when teachers utilize proper tools to identify areas of weakness in their students’ level of self-advocacy skills and consciously incorporate them into IEP goal development and classroom instruction.
Children with hearing loss should learn that they have a right and responsibility to access the same educational and social experiences as their peers.

**INTRODUCTION**

Self-advocacy is an essential component of social-emotional skill development. For children who are deaf or hard of hearing (DHH), self-advocacy is considered especially critical, as the broader population is not always understanding of their needs. Regardless of the severity of loss, all children who are DHH need to demonstrate the ability to advocate for themselves across settings and may require additional support in developing these skills. Age-appropriate self-advocacy skills can and should be introduced within early intervention home-based programs and within the preschool classroom to establish the foundation for future growth and development.

**METHODS**

A self-advocacy ratings questionnaire for young children who are DHH was developed and distributed to preschool through third-grade listening & spoken language teachers.

Participants included 12 teachers who offered their perceptions on the self-advocacy skills of their students with hearing loss (n = 64).

Teachers completed both quantitative and qualitative survey components that revealed information on:
- student skill level in hearing technology management, social and academic self-advocacy skills and proactive listening.
- frequency and type of self-advocacy goals listed in student Individualized Education Programs (IEPs)
- self-advocacy skills taught within the classroom
- impact of self-advocacy skill level on academic and social/emotional development
- teacher recommendations for fostering self-advocacy skill development.

**RESULTS**

Teacher perceptions of skill level increased from preschool to kindergarten across all three self-advocacy priority areas.

Skill level was generally higher in areas of self-advocacy that required a lower level of responsibility, greater expressive communication or interaction with others were identified as general areas of weakness.

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**RECOMMENDATIONS**

Children benefit when teachers foster age-appropriate self-advocacy skill development in their students across all self-advocacy priority areas and remain mindful that the level of self-advocacy skills attained in early childhood serve as a foundation for later success.

Children benefit when teachers utilize proper tools to identify areas of weakness in their students’ level of self-advocacy skills and consciously incorporate them into IEP goal development and classroom instruction.
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