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1 **Developments of student involvement in geoscience unions: a case study**
2 **from hydrology**

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30 The American Geophysical Union (AGU) and the European Geosciences Union (EGU) play
31 a central role in nurturing the next generation of geoscientists. Both organizations are now
32 explicitly expanding their bottom-up organizational structure to include early career
33 members¹ (hereafter, ECM), by appointing student (AGU) and [early career scientist](#) (EGU)
34 representatives. As this is a recent development, it is unclear what role these representatives
35 can play and how this role will evolve over the coming years.

36 As ECM in the hydrological sciences, we here provide a case study on how bottom-up
37 initiatives, working closely together with the newly appointed representatives, help to
38 improve the development of student and post-doc members, and provide opportunities to
39 increase their contribution to the geoscience unions. Additionally, we call for a conversation
40 on how ECM can best make use of the created opportunities to proactively engage with the
41 Unions' activities aiming at the development of their youngest members.

42 **Growing Opportunities for Early Career Members**

43 The AGU and EGU have a long history of actively supporting students by providing reduced
44 conference fees, recognizing outstanding students, and awarding travel grants. The
45 representation of these members has been improved with the recent appointment of
46 representatives for the different scientific divisions within both AGU and EGU. This is an
47 important development, as these representatives will serve as the link between Union
48 divisions and its ECM. However, as Union's do not want to constrain bottom-up initiatives,
49 precise aims and goals of these representatives have not been defined.

50 But what is the potential and what are the most important tasks of these new representatives?
51 With approximately one quarter of the Unions' active membership being students or young
52 scientists [1, 2] there is an opportunity to more actively include a new generation of
53 geoscientists also as contributors of the Union's activities, rather than merely consumers.
54 Hence, the representatives should think, discuss, define and communicate what their
55 objectives are and how these objectives can be achieved. Opinions on these objectives may
56 differ per person, field of study, or geoscience organization, and are likely to change over
57 time. Rather than providing a blueprint for what should be done, we try to catalyze this
58 discussion by providing an example of how this process is evolving within the hydrological
59 sciences community.

¹ Student and postdoc members; exact definitions different for [EGU](#) and [AGU](#).

60 **A Case Study from Hydrology**

61 During the 2012 EGU General Assembly in Vienna we identified that there was no
62 organizational structure for the involvement of ECM in the EGU Hydrological Sciences
63 Division, nor were they very actively involved within the division. It was clear that with so
64 many of them being part of the division, there was enormous potential to increase ECM
65 involvement. Not only to enhance their own conference experience, but also to improve their
66 contribution to the organizing part of the hydrologic community. This was the key motivation
67 behind the establishment of the [Young Hydrologic Society](#) (YHS) in October 2012.

68 YHS is a bottom-up initiative to engage ECM from across the globe with an interest in
69 hydrological sciences and aspires to function as an umbrella organization for many aspects
70 important to early career hydrologists. It is an independent organization, not solely founded
71 within a single Union. This allows that ideas and sessions can be transferred seamlessly
72 between different conferences.

73 The organizing committee is composed of volunteers currently spanning across three
74 continents. The representatives within the AGU and EGU hydrology divisions are among the
75 active members of the YHS team. This involvement facilitates good communication and
76 cooperation between any initiatives in both unions.

77 To ensure activities represent the need of a broader group than the organizing team, the YHS
78 hosts an annual public meeting at both the AGU Fall Meeting and the EGU General
79 Assembly. In this meeting we invite ECM and together evaluate objectives, define goals and
80 create opportunities for people to get involved. Based on these meetings five current
81 objectives have been established:

- 82 1) connect hydrologists early in their careers,
- 83 2) organize events to enhance the professional development of early career hydrologists,
- 84 3) provide central information platform for early career hydrologists,
- 85 4) create awareness of current and future research topics within hydrology, and
- 86 5) make hydrological science more accessible for involvement of early career
87 hydrologists.

88 To achieve these goals we created a [website](#) to provide notification of upcoming conferences,
89 workshops, events, free online lectures, and other relevant information. There is also a

90 number of social media platform including a [LinkedIn group](#), [Facebook group](#) and [Twitter](#)
91 [account](#) that keeps all members, friends and followers digitally connected.

92 Additionally, the YHS organizes sessions, short courses, and social events at the AGU Fall
93 Meeting and the EGU General Assembly. An example, aimed at increasing the awareness of
94 present challenges in hydrological science, is ‘[Meet the expert in hydrology](#)’. This session is
95 an open discussion with experienced scientists on current and future research challenges
96 within (and beyond) hydrological science. To create further awareness of future research
97 challenges, the Water Science Pop-Ups are organized. This session invites particularly those
98 embarking on a career in hydrology to share their vision on the future of water science with a
99 5-minute TED-style presentation. The Water Science Pop-Ups was first organized at the [2013](#)
100 [AGU Fall Meeting](#), nearly doubled in participation and attendance for [2014](#), and now also
101 runs at the [EGU General Assembly](#). At the 2014 Fall Meeting, YHS put together the
102 inaugural [AGU Student and Early Career Science Conference](#) [3]. This full day conferences
103 is now an annual event including networking, workshops, and discussion sessions where
104 students interact with senior scientists.

105 This overview of activities illustrates how initiatives can contribute to enhanced involvement
106 of ECM in geoscience organizations. Yet, we realize these initial activities have been
107 developed in a somewhat ad-hoc manner and there is always room for improvement.

108 **Start the conversation to move forward**

109 The example from hydrology may give an indication of how ECM initiatives can evolve and
110 could be replicated by other divisions. However, the example from hydrology, to a large
111 degree, does not answer what the full potential of ECM involvement is, and what the most
112 important tasks are of the representatives.

113 We call for a conversation that addresses these questions. Early career members, including
114 their representatives, and the leadership within the geoscience Unions should ask themselves
115 and another: what can the Unions do for the ECM, and what can the ECM do for the Unions?
116 Current goals seem to include enhanced networking opportunities and organization of short
117 courses, but probably there are uncovered opportunities far beyond that.

118 With the current the free role that the Unions give to the representatives some ad-hoc short-
119 term contributions are made. Given the representatives short terms of service (1-2 years) and
120 that they are often operating individually, has the risk that contributions are perishable.

121 Involvement of ECM in geoscience unions is not a panacea to all challenges faced by those
122 embarking on a career in geoscience. But, given the current support from the unions, it is the
123 ECM's responsibility to get organized and make the best use of this opportunity. To make the
124 most valuable contribution, objectives should both encompass short-term improvements that
125 spur momentum and long-term change to more actively engage ECM enthusiasm and
126 creativity in shaping a better geoscientific future.

127

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138

139 **Author contributions**

140 W.R.B, S.H, and E.L.K outlined the manuscript. All authors contributed to writing.