

# SWISS POLAR INSTITUTE

## SPI Science Plan: Consultation - Overview of all the submitted inputs

Inputs submitted as a reponse to the consultation					STAB Reaction	
Page concerned	Chapter concerned	Keyword	Proposed wording / suggestion for amendment	Remarks	Is the proposition accepted? (Y/N)	Response/remarks from authors
12-13	5	Data management and modeling	Statistical analysis of raw observational data (time series & spatial data) using advanced statistical inference is important for deepening our understanding of the environment. These may be instrumental data, e.g. raw time series data from climate stations (e.g. MeteoSwiss, ..), or spatial data on a global scale (e.g. total column ozone data, NASA), or deep (ice) core (time series) data (e.g. GRIP & others), etc. Questions such as change assessment, stochastic vs. deterministic trends, times of rapid climate change, exceedances (amounts & locations), non-stationary phenomena, probabilistic predictions of events to come, etc. can be addressed using appropriate statistical methods, which can complement and enhance the existing state of knowledge in climate research.	I suggest to <b>change the title</b> "Data management and modeling" to " <b>Data management, modeling, analysis and statistical inference</b> ". And <b>extend the text adding what is suggested (see the left column)</b> . I found only one mention of the phrase "time series" (page 8). Perhaps it would be better to highlight that climate observations are realizations of (stochastic) processes that are have subtle and complex properties, often accompanied by (spatial / temporal) correlations and non-stationarity. Careful statistical analysis of these data, addressing the underlying stochasticity, is needed for knowledge building.	Partly agreed, will add time series in the text, that is a good point and it was missing. Also added the sentence about observations are realizations of processes.	We like to keep the title short even if we are missing some of these key words
2	Paragraph 4, line 1:	Atmospheric observations	Analysis of atmospheric observations	Atmospheric observations" – is actually not a field.	N	The text should be easy and the wording should be clear ("everything that has to do with measurements".
2	Paragraph 4, line 3:	Modeling and observations of the cryosphere	<i>Modeling and analysis of observational data from the cryosphere ..</i>	Are you referring to the verb 'the act of observing'? Or do you mean, "Modeling and analysis of observational data from the cryosphere .." ?	N	"Observations" is used here as a colloquial expression for everything that has to do with measurements. This is standard practice if we want to keep the text easy
2	Paragraph 5	growing role	<i>an increasingly important role</i>		Y	
2	last line:	science fields	<i>fields of science</i>		Y	
	General comment – 1			General comment: compliments to the authors. Fun reading. Lots of information in short paragraphs! Great!		Thank you very much, your appreciation is very much appreciated
	General comment – 2			I spotted a few typos (e.g. page 2), which are obviously due to fast writing, .. but there may be more.		We know, we will try to minimise them, the work continues

13	III. The carbon, nitrogen, water cycle nexus – past, present, future	Carbon cycle	The “high-alpine” ecosystems are still poorly and not consistently depicted in the document. The same is true for inland waters. Given that our current understanding of the global carbon cycle is currently being rewritten because of the unexpected contribution of the inland waters to the carbon cycle, it would be a cardinal mistake to omit them from the flagship topics. These are very much centred on and around the Southern Ocean and the ice sheets etc. It would be good to find a finer balance here, one that reaches beyond the scope of those who wrote the paper.	General remark	N	The primary focus here is on the global cycles, where polar regions play an essential role. High-altitude regions are mentioned in the box "III - The carbon ... nexus".
17	III. Biodiversity and ecosystem functions	Ecosystem functioning and biogeochemistry	It would make sense to understand biogeochemistry as an inherent consequence of ecosystem functions. For instance, metabolism is a key ecosystem function and drives both carbon and nutrient fluxes (incl Fe, Si etc). So we are in the very heart of biogeochemistry. It would be intuitive to go all the way from biodiversity to ecosystem functions and biogeochemistry – and this in a comparative mode (!! ) across the terrestrial, freshwater and marine ecosystems.	General remark	Y	We added 'biogeochemicals' and 'across terr., freshw., and marine' in the list of examples for future work as follows '- Identify present-day main drivers of biodiversity and ecosystem change, and quantify effects on fluxes of energy, carbon, water, carbon and other biogeochemicals across the terrestrial, freshwater, and marine domains.'
18	III. Technology	Technology in extreme	You may like to add the amazing development related		Y - very good point	Added the sense: New sensor development
6	II. SWISS POLAR	Map providing an	On a minor side, please add biodiversity, ecosystem		Y	
3	Supporting the		I suggest rewording the part beginning with "In line with		N	The bottom-up nature refers to the science done in Switzerland not to
15	Cryosphere		As stated now, 3 out of 4 "research activities by the			It is actually 2 out of 4 research activities that are
18	Technology in		Similar comment as above: The focus on ice-coring		N	We see only one point that is really connected to ice core research. In
all	whole		The document seems to strongly rely on the concept of			future. Engagements with the community, if we may use this concept,
22	contributions		Again a concern related to the "community" feeling: I			Idem
6	overview map		WGMS: 125 years of internationally coordinated glacier	Add another box about the World Glacier	Y	World glacier monitoring will be added to UZH,
7	Glaciers and ice		Please correct to "Glacier and Ice Sheet mass balance"		Y	Done
7	Glaciers and ice		Internationally coordinated glacier monitoring was	Add a short section about the WGMS. It	Y	A sentence has been added but in line
21	V. Looking to	outreach	change bracket to „(including conferences, dedicated	To give the SPI the possibility to raise	Y	
general				Thanks for the opportunity to comment on		SPI has taken good note of the input and we will keep it in mind for the
6	II	Map	PSI is in the wrong place		Y	The map will be revised in the edited version
8	II.2 The	whole section	<u>Aerosols, water and cloud in polar and alpine</u>	The first paragraph is disorganized in my	N	While we agree that atmosphere/aerosol science could be better
9	II.2 Energy cycle	cycle	Energy fluxes as driver of change	The term 'energy cycle' is not familiar to me	Y	Done in the whole text
13	II. 6 Societies in		Especially the Arctic, people are exposed to extreme	This aspect is missing.	N	The chapter really focuses on social sciences now.
14	first paragraph		... the Arctic and the Antarctic		N	High altitude extreme environments added,
16	bullet point 2			It is good to see that atmospheric transport	Y	thanks for this remark; good idea to make this
16	section on "The			The contribution of Swiss research to	?	Thank you, we will have to further inquire on that
21	paragraph 2		... the following points have been identified as priorities	repetition of priorities	Y	Thank you very much for drawing our attention
10	2. Polar	pollution	<u>suggestion for amendment to first paragraph on</u>	I acknowledge the great importance of	Y	Added
7	II.1	Jakobshavn	A strong focus of Swiss research in this field has been	ice flow dynamics has also been	Y	done
19	III	midnight sun	Swiss solar-powered flying platforms have been tested	Maybe one can specify that this refers to	Y	done
12	II.5	Miniaturisation	Miniaturisation can also play a key role in successful	This sentence appears twice (also p 18), and	Y	Good point, added a sentence
p.7	chapter II, 1	subtitle	Glacier and ice sheet mass balance' or 'Mass balance of	grammatical error in original title; but I also	Y	done

p.7 & 8	chapter II, 1	Snow and firn		There is much more weight on snow and	Y	we agree and have shortened this subchapter
6	II		Map: Correct location of PSI (further north)		Y	
7	II.1		Title: Polar ice sheets and <b>glaciers</b> as climate archives	include "glaciers"	Y	
18	III		Novel technologies for extracting core samples (i.e.,	delete "Arctic", include glaciers	Y	
2		and the Arctic Council	and the Arctic Council where Switzerland has been	more accurate	Y	
3		<del>and since Switzerland</del>	. Since Switzerland have been approved in 2017 as		Y	
6	Map	UniNe ethnographie	ethnography		Y	
6	Map	UniBe	Ice coring, glaciology, climate, <b>atmospheric</b>	The Oeschger Centre for Climate Change	Y	The map of the edited version will include this point
6	Map		For the University of Lausanne please add "permafrost"		Y	The map of the edited version will include this point
6 and followings			A chapter on mountain permfrost is missing. Several			A sentence on page 9 has been added, but not
11	II. SWISS POLAR	Reduce	Line starting with " <i>The Swiss science community is well-</i>	Reducing uncertainty could be	Y	Changed to 'address' and slightly reworded
11 and 17	II. SWISS POLAR	Ecosystem functioning	Linking observed changes in ecosystems functioning	The ecosystem services community (which		Many different approaches exist to address
13	II. SWISS POLAR	Interdisciplinarity	Line starting with " <i>Yet at present, this has not been</i>	Linking to natural sciences research implies	Yes, with adaptations	Full agreement with the suggestion. This perspective is integrated in the
15	III. INCREASING	Observations,		In line with statement making reference to		Thank you for this remark. The comment does not
13	6	societies		I send a separate word document, as this is	We take note of your	
19	III	societies		should add a short paragraph on SSH in this	We take note of your	
6	Map	Map	Strengths at ETHZ: also include 'marine micronutrients'		Y	The map of the edited version will include this point
9	II.2.	Carbon and nitrogen	"[The Polar oceans represent key regions...subsurface	The section "The role of carbon and	Y	Done
9	II.2.	Carbon and nitrogen	[Swiss Polar scientists are closely involved in	The section "The role of carbon and	Y	Done
10	II.3.	Polar oceans	[The polar oceans are key components of the climate	This section currently only focuses on	Y	Done
10 & 11	II.3.	Polar oceans	[...Swiss scientists have contributed...in <b>four</b> areas...]	Marine biogeochemistry is not mentioned	Y	Done
11	II.4.	Biodiversity and	[But also other parts of the world will be affected,	This section currenty focuses mainly on	Y	Accepted in section Biodiversity and Ecosystems
11	II.4.	Biodiversity and	[Current strengths of Swiss Polar ecology include...(iii)		Y	
16	III	Carbon, nitrogen, water	[Whilst important research questions exist related to	Interactions between trace metal	Y	Done
16	III	Carbon, nitrogen, water	[Development of couple Earth system model...this		Y	Done
6	Map outlining	Basel	add: marine mammals, pathology, environmental		Y	
6	Map outlining	UniZH	add or specify: environmental history (instead historical		Y	
9	Monitoring	headline	why is this a chapter of (1)'Snow, glaciers and ice		?	We guess this is a misunderstanding, it is part of chapter <i>Polar processes</i>
9	Monitoring	headline	I think the research done in his field aims at		Y	Proposition included in paragraph
11	Biodiversity and	Arctic' (I 5)	replace by: all three poles		Y	changed 'Arctic' to 'at the poles'
11	Biodiversity and	vulnerable ecosystems.'	to be introduced after the 3d sentence: "Environmental			the topic of pollution has been given more weight in the overall
11	Biodiversity and	... Consequences for' (I.	introduce here: "ecosystem functioning and		Y	done
11	Biodiversity and	But also other parts...	I don't think that this first part of this sentence make		Y	done
11	Biodiversity and	migratory species	suggest to introduce here: '... And invasive species.'		N	This sentence addresses processes that
11	Biodiversity and	The Swissscience	I would suggest to make a sub-chapter here, titled, e.g.			Thank you for this suggestion, we have taken note
11	Biodiversity and	In marine ecology	I would suggest to make a sub-chapter here, titled, e.g.			Thank you for this suggestion, we have taken note
11	Biodiversity and	Southern Ocean	add (iv); response and adaptation of fish to extreme		yes	fits better under Biodiversity and Ecosystems;
13	Societies in the	living conditions	introduce: Due to growing human populations and		Yes, with adaptations	The first sentence is reflected in the new version of the chapter. Swiss
17	Biodiversity and	resources (I2)	introduce after 'resources' used/managed by local		Y	done
17	Biodiversity and	plan communities	introduce after 'communities': 'to fish and marine		N	this sentence is targeting biodiversity and
18	box 1	IPBES	introduce after 'IPBES': IWC		Y	done
21	Looking to the	Swiss research	Suggestion to introduce a sentence on teaching and		Y	done
1	Foreword	extreme weather events	add "extreme weather events" to first bullet item	The role and nature of extreme events is	Y	
2	Foreword	high-altitude	(such as sea ice, glacier and ice sheets, <b>mountains</b> and	High-altitude is mentioned in the previous		The STAB stresses that science at the third pole is
2/14	Foreword/III -	high-altitude		The unique opportunity of Switzerland, with		The STAB decided on a certain line to be drawn

6	Figure		add permafrost and wireless sensor technologies to		Y	
6	Figure		add permafrost to UniZH competencies; probably also		Y	
6-11	II - Swiss Polar	permafrost	add a section on permafrost, specifically mountain	The role, importance and Swiss expertise in	Y	We added a sentence on PERMOS on page 9.
2	Foreword		remove "extreme" from sentence: Moreover, the highly	alpine environments must in principle be	Y	
14	III - Increasing	wording unclear		The second sentence makes no sense.	Y	Yes this sentence was scrambled. We made a new
18	Technology in	technology	Add "remote control of experiments" to third bullet.	Future experiments need real-time control	Y	
18	Technology in		Add a bullet/subsection on "Test new technology here	Another unique position for Switzerland is,	N	The basic remarks is good to develop here in CH
most pages	mostly chatpter	topic balance	In general rather unbalanced between general topics			SPI used the inputs of this consultation to enhance
2	Foreword,		maybe it was not meant like this but this paragraph			We don't read it this way, but made a word change
	chapter 2 and 3		it occured to me that the topic of geophysics never			This is correct, geophysics is hidden in many of
5	chapter 1,		paragraph 3, line 2: 'multi-annual ice' makes no sense in		Y	done
5	chapter 1		somewhere the role of modelling and remote-sensing		Y	Sentence added
6	chapter 2 figure		i am concerned about the representativeness of this		Y	The map will be updated, as many inputs refer
	Chapter II and		In general: high-mountain permafrost (including rock		Y	We added a sentence on PERMOS on page 9.
6 to 8	Chapter II,		This section seems unbalanced regarding topic content		Y	The snow section has been shortened
6	Chapter II,		Introduction, bottom paragraph: This paragraph		Y	Subchapters have been reworked
6	Chapter II,		the title of this section is awkward (if not wrong) and		Y	done
6	Chapter II,		I assume the subsections should be focused on the		Y	The chapter has been adjusted to better reflect
6 to 8	Chapter II,		Line 6 of top paragraph: current warming already DOES		Y	done
6 to 7	Chapter II,		This section is in comparison to the other topic-		Y	shortened
12	Chapter II,		Section 5 critical enablers.: line 5 in 4 <sup>th</sup> paragraph on		Y	agreed and done (this was just an example but
13	Chapter II,		section 5, subsection: Data management and modelling:		Y	Agreed, we added these activities
13	Chapter II,		first line, second last paragraph: I would extend this to:		No	The issue of natural resources from the South American and Asian high
14 to 15	Chapter III		Subsection 'Cryosphere through time - ...': I have		Y	Decadal has been added
14	Chapter III		Subsection 'Cryosphere through time - ...', line 2-3: yes,		Y	half a sentence added
15	Chapter III		Subsection 'Cryosphere through time - ...', first bullet		Y	done
15	Chapter III		Subsection 'Cryosphere through time - ...', bullet point			Thank you for your suggestion.
19	Chapter III,		This subsection is far too strongly focused on drones		Y	The empahsis on drones has been reduced and
21	Chapter V		paragraph 5: this is a personal opinion: I do not think we			The Swiss Data Sceince Cengter of the ETH Domain
21	Chapter V		paragraph 8: If the swiss government would co-fund SPI			SPI has taken good note of this opinion.
All	All	1	With my full respect to the work of the authors of this			We have taken note of your remark and discussed it within the STAB.
All	All	2	Form and Layout: The document has no clear layout			The consistency of the document will be improved
All	All	3	Section III is even more awful: After an introsection I			The consistency of the document will be improved
All	All	4	Section IV has no further subsections, whereas Section			We have taken note of your remark and discussed it within the STAB.
All	All	5	To get the document more accessible, I suggest			This will be done for the finalised version of the
All	All	6	I have the impression that there is lots of repetition in			SPI has taken good note of the input but we will
2	Foreword	7	"With the high-altitude regions ...": Why oly Switzerland			
2	Foreword	8	"Swiss research groups are widely ...": Who has decided			SPI has taken good note of the input, it is certainly
2	Foreword	9	"The wide diversity of ..." I suggest writing Polar when			The document will be edited once we have included
3	Foreword	10	The text in the box is not introduced, where does it			Its purpose is to introduce the reader to what is mentioned in the title
5		11	Please write: "The thawing of permafrost, the absence		Y	done
6 to 19	II and III	12	I have the impression that there is lots of repetition in			SPI has taken good note of the input but we will
6 to 19	II and III	13	I have the impression that the main (flagship) topics and			SPI has taken good note of the input
14 to 15	III	14	I suggest to strictly separate needs for ice sheet		N	The STAB decided on a certain line to be drawn
15	III	15	"in the field of glaciology, snow and ice research": to my		N	Thank you, we have taken note note of you remark
19	III	16	I think the research vision for remote sensing		Y	agreed, we changed the text accordinngly
19	III	17	"tested in Polar regions monitoring glaciers": This is not		Y	we changed monitoring to measuring
10	II. SWISS POLAR	Microplastic pollution	<u>Suggested addition to the section "Monitoring</u>	*The working group of Prof. Dr. Patricia	Y	
Chapter III	III. INCREASING	Environmental pollution	<u>Suggested as addition to chapter III:</u>		N	the topic has been integrated in the document

2	Foreward	livelihood/indigenous		Including high mountains in the research		Thank you for this remark, which will be discussed
13	Societies in the	social sciences and		Paragraph 6 seems to be at odd with the	Y	The spirit of this comment is reflected in the new version of the chapter.
14	Impacts	Risks		Looking in particular into mountain		Thank you for this remark, which will be discussed
6	II / figure (map)	map	UZH is the correct abbrev. Not UniZH. For UZH, natural		Y	Will be added to the updated map
14-20	III Increasing	impact		The four main boxes / thematic strands		Thank you for this remark, which will be discussed
9	II.2.	Carbon and nitrogen	"[The Polar oceans represent key regions...subsurface	The section "The role of carbon and	Y	Done
10	II.3.	Polar ocean and sea ice	The acidification will strongly stress marine	More than changes in food chain is	Y	Done
11	II.4	Biodiversity and	migratory species. <b>Microbes and viruses, due to their</b>	Role of microbila loop and viruses need to	Y	Done
11	II.4	Biodiversity and	between climate, <b>microorganisms</b> , vegetation, and	Microbial world has to be included as well	Y	Done
11	II.4	Biodiversity and	(iii) the relations of phytoplankton with the	Microbial world has to be included as well	Y	Done
16		Polar ocean and	How important are Southern Ocean freshwater fluxes		Y	Done
16		Polar ocean and	Southern Ocean campaign to study the role of		Y	Done